COMMONWEALTH BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 28] December, 1958 [No. 12

DISEASES CAUSED BY BACTERIA AND FUNGI

THÖRNE, H. (1958). Bovin mastit med fynd av stafylococcer i sekretet med särskild hänsyn till sambandet mellan kliniska och bakteriologiska iakttagelser. **[Bovine staphylococcal mastitis with special reference to the correlation between clinical and bacteriological observations.]**—*Nord. VetMed.* **10,** 309-324. [In Swedish. Summaries in English and German.] **3813**

Over a period of 5 years the author studied staphylococcal mastitis in 3,000 cows of 130 herds. Environmental factors predisposing to mastitis were discussed. The commonest form of mastitis was chronic, with vague clinical symptoms; acute forms, some derived from chronic cases, also occurred. In 3 cows which died from acute staphylococcal mastitis, clostridia were also present in udder secretion.

—R.M.

NAKAGAWA, M. (1958). **Studies on staphylococci from the bovine udder. I. Biological characteristics of staphylococci and some observations on the pathogenic strains.**—*Jap. J. vet. Res.* **6,** 19-34. [In English.] **3814**

In a bacteriological survey on bovine mastitis in Hokkaido, Japan, 515 of the 678 strains of micrococci isolated from milk samples were identified as staphylococci. Pigment production showed that 65% were *Staph. aureus* and 75% of these fermented mannitol, 31% were *Staph. albus* of which 47·2% were mannitol fermenters, and 3% were *Staph. citreus* of which 43·7% fermented mannitol. No significant correlation was observed between pigment production or mannitol fermentation and the ability to produce coagulase or haemolysin whilst pigment production and mannitol fermentation did not distinguish pathogenic from non-pathogenic strains. Haemolysins were produced by 33% of the strains, the majority showing complex haemolysin patterns; all except 5 of the haemolytic strains were coagulase producers but 7% of the non-haemolytic strains also were. Coagulase and haemolysin production appeared closely associated with the enterotoxigenicity of staphylococci, but haemolytic strains were not always enterotoxigenic, whilst non-coagulase, non-haemolytic strains were not necessarily non-pathogenic.—A. ACKROYD.

NYIREDY, I. (1958). Egyszerű táptalaj pathogen és apathogen staphylococcusok elkülönitésére. **[Differentiation of pathogenic from non-pathogenic staphylococci with the aid of a culture medium.]** — *Mag. állator. Lapja* **13,** 57-58. [In Hungarian. Summaries in English and Russian.] **3815**

Violet-red agar plates containing 1% mannitol, 5% defibrinated blood and 4% bromcresol red saturated solution were used for differentiation of pathogenic from non-pathogenic staphylococci by their different haemolytic and mannitol-splitting properties. The pathogenic cocci grew as gold-yellow colonies with complete haemolysis around them. The non-haemolytic and non mannitol-splitting saprophytic cocci grew in violet-blue colonies without altering the culture medium. It is nevertheless suggested that in positive cases the coagulase test should also be used for the exclusion of the few haemolytic and mannitol-splitting saprophytes.—A. SEBESTENY.

LOVELL, H. R. (1958). **Incorporation of disodium *p*-nitrophenylphosphate in solid medium for the detection of phosphatase production by *Micrococcus pyogenes* var. *aureus*.** —*Nature, Lond.* **181,** 995-996. **3816**

The medium consists of nutrient agar to which is added a sterile soln. of disodium *p*-nitrophenylphosphate. The streaked Petri dishes are incubated at 37°C. for 24 hours, when the presence of phosphatase is indicated by the yellow colour of *p*-nitrophenol liberated around colonies of *Staphylococcus aureus*. High concentrations of NaCl in the medium inhibit the formation of phosphatase only slightly.

—M.G.G.

SENZE, A. & JAKUBOWSKI, S. (1957). Wpływ penicyliny i streptomycyny na mleneczność przy leczeniu tzw. utajonego nieżytu wymienia u krów. **[Influence of penicillin and streptomycin on milk yield of cows excreting *Streptococcus agalactiae* in the milk, but without clinical symptoms.]** — *Weterynaria, Wrocław* No. 3 pp. 135-149. [In Polish. Summary in German.] **3817**

From 504 cows on 2 farms, the authors selected 79 which were excreting *Str. agalactiae* but had no clinical symptoms. On one farm the cows were treated with intramammary penicillin, 25,000 units a quarter twice daily for 3 days; on the other farm a combined penicillin and streptomycin treatment was given (on the 1st day 25,000 units penicillin and 0·25 g. streptomycin a quarter, on the 2nd and 3rd day 50,000 units penicillin and 0·25 g. streptomycin a quarter twice daily). No increase in the milk yield was noted and the authors are of the opinion that treatment of cows excreting *Str. agalactiae* but not showing clinical symptoms is not justified on the grounds of economy.

—M. GITTER.

MILUNOVIĆ, M. (1958). Osjetljivost streptokoka izoliranih iz bolesnog vimena krava muzara na neka antibiotika. **[Susceptibility to antibiotics of mammary streptococci from cows.]** —*Vet. Arhiv* **28,** 122-129. [In Croat. Summaries in English and German.] **3818**

Sensitivity to antibiotics was tested *in vitro* in 522 freshly isolated strains of *Streptococcus agalactiae,* 32 of *Str. dysgalactiae,* 14 of *Str. uberis* and 9 of *Str. zooepidemicus.* Of the 522 *Str. agalactiae* strains 4 were resistant to penicillin, 189 to streptomycin, 4 to chlortetracycline, 3 to chloramphenicol, and 3 to oxytetracycline. Of 490 *Str. agalactiae* strains 466 were resistant to sulphathiazole. Of 32 *Str. dysgalactiae* strains 3 were resistant to streptomycin and 23 to sulphathiazole. Of 14 strains of *Str. uberis* 10 were resistant to sulphathiazole, and of 9 *Str. zooepidemicus* strains 2 were resistant to streptomycin and 7 to sulphathiazole.—E.G.

SIMON, J., MARTINOVICH, P. & REESE, P. (1958). **Total bacterial counts and their value in detection of herd mastitis problems.**—*Vet. Med.* **53,** 357-360. **3819**

In 11 dairy herds studied continuously for over 4 years, no correlation was observed between the prevalence of mastitis as determined by lab. tests in the herds sampled at random and total bacterial counts on pooled herd milk. The data suggest that the usual procedures for determining total bacterial counts of milk may be inadequate for the detection of herd mastitis.

—A. ACKROYD.

SCHALM, O. W. (1958). **Mechanical milking and mastitis.**—*N. Amer. Vet. Sect.* 1, *Amer. J. Vet. Sci.* **39,** 43-49. **3820**

A general account with special emphasis on dimensions, function and deterioration with use of teat-cup liners. The advantages of narrow-bore liners having an internal diam. of 19 mm. over the usual size of 25 or 32 mm. were discussed. S. described an attachment of transparent plastic inserted between the teat-cup and collecting tube, by means of which it was possible to see when milk flow from the quarter ceased. It was considered to be important to remove teat-cups as soon as the flow of milk ceased.—R.M.

MELANIDI, C. & TZORTZAKI, N. (1958). **[Sensitivity of brain of rabbits hyperimmunized against anthrax.]**—*Delt. Hellen. kten. Hetair.* **2,** No. 29. pp. 3-4. [In Greek. Abst. from French summary.] **3821**

Ten rabbits, eight hyperimmunized against anthrax and two controls, died within 3 days after intracerebral infection with 0·125 ml. of anthrax culture diluted 1:1000. In the hyperimmunized rabbits *B. anthracis* was demonstrated in the brain only, from which the authors concluded that the c.n.s. of hyperimmunized rabbits is particularly susceptible to infection.—E.G.

CALAPRICE, A. & DE CHINA, T. (1958). Su di un caso di tubercolosi miliare nel cavallo (indagini batteriologiche ed istologiche). **[Miliary TB. of avian type in a horse.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 854-858. [Summaries in French and German.] **3822**

Avian type *Mycobact. tuberculosis* was isolated from miliary lesions in the lungs, bronchial lymph nodes and liver of a horse.

—T.E.G.R.

MEYN, A. (1957). Die Fortschritte der Rindertuberkulosebekämpfung in der Bundesrepublik (Stand vom 1.7.1957). **[Progress in the control of bovine tuberculosis in the German Federal Republic.]** — *Rindertuberk. u. Brucellose* **6,** 185-192. **3823**

Between July 1956 and July 1957, 140,501 herds, containing 1,425,243 cattle, were officially recognized as free from TB., an increase of 10·3% of all herds and 12·1% of all cattle. There are now 821,801 attested herds in the German

Federal Republic, 60% of the total. [See also *V.B.* **26,** 3348.] In South Würtemberg, a heavily infected area, bovine tubercle bacilli were isolated from 19·2% of human patients with pulmonary TB. and from 58·6% of patients with extra-pulmonary TB. The incidence of pulmonary bovine type TB. was 9% in patients aged under 30, but 34% in those aged over 30. These 34% were nearly all workers in cattle byres.—M.G.G.

SOBIECH, T., LIPANOWICZ, J. & SARAPATO, J. (1957). Badania nad obecnością prątków gruźlicy w mleku krów. **[Tubercle bacilli in cows' milk in Poland.]** — *Weterynaria, Wrocław* No. 3 pp. 35-57. [In Polish. Summary in German.] **3824**

The authors examined clinically 110 cows, tested them all with Koch's tuberculin, and 36 of them also with P.P.D., and collected milk samples from all quarters; later the animals were slaughtered and examined P.M. On clinical examination there was a strong suspicion of TB. in 18, and slight in 13 cases. Koch's tuberculin yielded 52 positive, 17 suspicious and 41 negative results. While in 30 out of 36 cows tested with P.P.D. the results were the same as with Koch's tuberculin, in 4 cases the P.P.D. proved more specific. P.M. examinations revealed tuberculous lesions in 68 cows, but none of them was in the udder. Acid-fast organisms were found in milk samples from 27 cows, but culture and g.pig inoculation (2 g.pigs per sample) failed to yield tubercle bacilli. The authors expressed an opinion that the results of their work, which involved only one milk sampling, do not exclude the possibility that tubercle bacilli may be excreted intermittently in the milk of cows in which the udder is not affected.—M. GITTER.

GALE, D., DE VESTY, G. & JACK, A. (1958). **A rapid mouse test for the diagnosis of pulmonary tuberculosis. I. The enhancement of experimental tuberculosis in mice by hog gastric mucin.**—*Amer. Rev. Tuberc.* **77,** 1005-1011. [Authors' summary modified.] **3825**

Mucin enhanced experimental TB. in mice. With virulent strains, fewer organisms were required to produce comparable pathological changes when injected i/p with mucin rather than with saline. No enhancement of infectivity was obtained with an avirulent strain. With small numbers of the H37Rv strain of *M. tuberculosis,* twice as many splenic cultures positive for tubercle bacilli were obtained from the mucin series as from the saline controls. With 10^6 H37Rv bacilli, enlargement of the spleen could be seen in the mucin-treated mice 9 days after inoculation compared with 21 days in the saline-treated series.

ALOSI, C. & BIONDI, E. (1958). Sulle modificazioni elettroforetiche delle proteine seriche nei bovini affetti da tubercolosi. **[Electrophoretic study of the serum proteins in cattle with TB.]**—*Zooprofilassi* **13,** 233-253. **3826**

A comparative electrophoretic study of the serum proteins in healthy and in tuberculous cattle.—T.E.G.R.

ZBOŘIL, J. (1958). Vakcinácia teliat proti tuberkulóze. **[Vaccination of calves against TB.]** — *Vet. Čas.* **7,** 144-159. [In Slovak. Summaries in English, French, German and Russian.] **3827**

Under field conditions 26 calves were vaccinated against TB. with B.C.G. and 876 with Wells' murine strain of *Mycobact. tuberculosis.* Vaccinated calves appeared to be resistant to natural and experimental infection. There were local reactions of a temporary nature. P.M. appearance of carcasses of vaccinated calves indicated that the vaccine was harmless. Allergic reactions were demonstrable for periods from 2–25 months. About 45% reacted to Old Tuberculin and 87% to heat-inactivated Wells' vaccine. Differentiation between post-infection and post-vaccination allergy was impossible. Use of Wells' strain for the protection of calves exposed to infection was advocated. [*See also V.B.* **25,** 2661.]—E.G.

MYRVIK, Q. N. & SOTO-FIGUEROA, E. (1958). **A new tuberculostatic protein isolated from bovine spleen.**—*Amer. Rev. Tuberc.* **78,** 93-100. [Summaries in French and Spanish. Authors' summary modified.] **3828**

A protein with tuberculostatic properties against virulent mammalian tubercle bacilli was isolated from bovine spleen. It was more active against virulent human than against virulent bovine tubercle bacilli. It was inactive for two saprophytic strains (*M. smegmatis* and *M. phlei*).

WEISS, D. W. (1958). **Inhibition of tuberculin skin hypersensitivity in guinea pigs by injection of tuberculin and intact tubercle bacilli during fetal life.**—*J. exp. Med.* **108,** 83-104. [Author's summary modified.] **3829**

Unborn g.pigs were inoculated with Old Tuberculin, B.C.G. tubercle bacilli killed by heat or by phenol, or living B.C.G. Many of those given O.T. failed to develop skin hypersensitivity to P.P.D. after vaccination with 200

or 800 μg. phenol-killed B.C.G. early in adult life, whereas all control animals were sensitized by vaccination. Foetal inoculation with killed B.C.G. conferred tolerance on a few animals, and rendered others tuberculin-sensitive. Foetal inoculation with living B.C.G. sensitized most animals to tuberculin, even when the inoculation was as early as 46 days before birth, and induced tolerance in none. Foetuses of the same litter, given identical inocula simultaneously, often responded differently, some becoming tolerant to tuberculin, others developing hypersensitivity, and others remaining immunologically unaffected, becoming neither sensitive nor tolerant. The tolerance induced was limited. When tolerant animals were revaccinated with living B.C.G. several weeks after vaccination with phenol-killed bacilli, they developed as high a degree of skin sensitivity as the non-tolerant animals.

TRAUTWEIN, K. & NASSAL, J. (1958). Die bakterizide Wirkung von 33 vergleichend geprüften Desinfektionsmitteln, speziell gegenüber Tuberkelbakterien. [**Bactericidal action of 33 disinfectants, particularly against tubercle bacilli.**]—*Rindertuberk. u. Brucellose* **7**, 1-10. **3830**

Bactericidal action was tested by placing in the disinfectant strips of filter paper or surgical silk, soaked in suspensions of either bovine type tubercle bacilli, *Staph. pyogenes*, or *E. coli*, in water or in milk. Each disinfectant was allowed to act for from 15 to 120 min. at room temp. Between 50 and 100 tests were performed on each disinfectant. Only 15 of the 33 disinfectants had a tuberculocidal action, at conc. of up to 10%, equivalent to 3% formaldehyde solution. They included derivatives of phenol and cresol, glycols, etheric oils and ampholyte soaps. Details of the disinfectants are given and test results are tabulated.—R.M.

GORET, P. & JOUBERT, L. (1957). Recherches expérimentales sur la bactériologie et les propriétés immunisantes et vaccinothérapiques antituberculeuses d'une souche de bacille acido résistant avirulent. [*Mycobacterium friedmannii*: **its bacteriology and its immunizing and therapeutic value in tuberculosis.**]—*Bull. Soc. Sci. vét. Lyon.* **58 & 59**, 467-491 & 537-569. **3831**

Strain 55-41 of the organism, isolated in 1902 from a turtle, possessed properties intermediate between those of pathogenic and non-pathogenic mycobacteria. Extracts injected i/d gave an allergic reaction in g.pigs infected with TB. or Johne's disease, but the reaction occurred much later than reactions to tuberculin or johnin. G.pigs inoculated at intervals of 8 days with 4 doses each of 75 mg. of the organism, reacted to i/d inj. of tuberculin or johnin 5 weeks later. G.pigs inoculated with the strain were not immune to subsequent infection with tubercle bacilli.—R.M.

SMITH, H. WILLIAMS. (1958). **The isolation of *Mycobacterium johnei* and other acid-fast bacilli from the retropharyngeal and ileocaecal lymph-glands and spleen of apparently normal cattle.**—*J. Path. Bact.* **76**, 201-204. [Author's summary modified.] **3832**

The retropharyngeal and ileocaecal lymph nodes and spleens of 100 apparently healthy slaughtered cattle were examined culturally.

M. johnei was isolated only from the retropharyngeal lymph node in 3 animals and only from the ileocaecal lymph node in one animal. It was found only in the retropharyngeal lymph node and spleen in 2 animals and in all three sites in one animal. Avian tubercle bacilli were isolated only from the retropharyngeal lymph node in 3 animals and only from the ileocaecal lymph node in 2 animals. Unidentified acid-fast bacilli were found only in the retropharyngeal lymph node in 3 animals and only in the ileocaecal lymph node in one animal.

The significance of these results is discussed, particularly in regard to the pathogenesis of Johne's disease.

HART, P. D'A. (1958). **A mycobactin-containing liquid medium for the study of *Mycobacterium johnei*.**—*J. Path. Bact.* **76**, 205-210. [Author's summary modified.] **3833**

A liquid medium is described, based on the "Tween"–albumin medium commonly used for culturing *M. tuberculosis*, and suitable for the culture of mycobactin-dependent laboratory strains of *M. johnei*. The medium contains mycobactin at 1 μg./ml., dispersed into the medium after prior solution in propylene glycol, and is completely clear. Albumin 0·5%, but no serum, is included. Tween 80 (0·05%) is advantageous to growth, but can be omitted. Growth is dispersed macroscopically and microscopically, particularly if Tween is included. The medium is convenient for the production of dispersed cultures in quantity, and also for tests of bacteriostatic activity of potential chemotherapeutic substances. It has not been investigated for its suitability for primary isolation but, by analogy with *M. tuberculosis*, solid media would seem to be preferable.

FORD, E. J. H. (1957). **The fate of *Mycobacterium johnei* in young mice and guinea-pigs.**—*J. Path. Bact.* **73,** 363-374. **3834**

160 mice aged between 9 and 12 days were each inoculated intraperitoneally once or twice with 2 mg. moist *M. johnei* suspended in saline, and a similar number of controls received saline only. 20 g.pigs aged 10 days were similarly inoculated twice with 10 mg. of moist bacteria and there were 20 controls. Viable *M. johnei* were recovered from liver and spleen for up to 37 weeks after infection, but not at 50 weeks. Two groups of infected mice were also treated with cortisone in 0·2 mg. doses for the first 6 or 13 days after infection. Cortisone did not facilitate the persistence of the bacteria in the body and appeared to hasten their elimination. No intestinal lesions characteristic of the disease in ruminants, were found in g.pigs. The only evidence of intestinal infection in mice was a postive smear in one case: histological sections did not show heavy bacterial invasion of mucosa and muscle.—R.M.

REES, R. J. W. & WONG, P. C. (1958). **Limited multiplication of *M. lepraemurium* in tissue culture.**—*Nature, Lond.* **181,** 359-360. **3835**

Multiplication of the rat leprosy bacillus was demonstrated in explants of spleen removed from a mouse infected i/v 8 weeks previously. The rate of multiplication corresponded closely to that observed *in vivo* in mice. Multiplication was confined to the initial period of cultivation when the cell cultures were healthy. It is concluded that for continued multiplication the organism requires a regular supply of healthy cells, preferably in a medium containing low concentrations of serum, since serum inhibits its endogenous metabolism.—M.G.G.

RIBI, E., LARSON, C. L., LIST, R. & WICHT, W. (1958). **Immunologic significance of the cell wall of mycobacteria.**—*Proc. Soc. exp. Biol., N.Y.* **98,** 263-265. [Authors' summary modified.] **3836**

A technique was described for separation of cell wall and internal protoplasm from cells of mycobacteria. Cell walls produced lesions when injected intradermally into rabbits, whereas protoplasm failed to produce these lesions. Cell walls were also capable of inducing hypersensitivity of the delayed type.

JOUBERT, L. & PHUNG VAN DAN. (1958). Epidémiologie et prophylaxie de la mélioïdose, zoonose tropicale. Acquisitions récentes. **[Epidemiology and prophylaxis of melioidosis in man and animals in the Tropics.]**—*Rev. Élev.* **11,** 23-29. [Summaries in English and Spanish.] **3837**

The authors state that in Viet-Nam melioidosis is a "hydro-telluric" disease; it affects rats especially and pigs which may be carriers; the organism is found in stagnant waters, ponds, rice-swamps etc. and is transmitted by skin abrasions and contact with polluted water, arthropod bites, and in man by milk or meat of infected animals. Some pigs and buffaloes have a high titre of natural antibodies, *e.g.* out of 44 [presumably healthy] pigs sent to the Saigon abattoir 7 had a titre higher than 1/40.

Prophylaxis should be compulsory—environmental hygiene measures, especially anti-rodent, drainage of marshes etc. (in combination with the anti-malaria campaign) intradermal testing with "whitmorin" and slaughter of all animals which are reactors or clinically ill, with disinfection of the lairage—against human disease, avoidance of polluted waters, special attention to milk or meat and other foods from infected animals, and particular care against lab. infection. [There is insufficient reference concerning the reliability of "whitmorin" as a diagnostic agent and it is very doubtful indeed whether even the most drastic regulations would induce the rural Viet-Namese to part with their buffaloes—which in the rice-growing areas of the Far East form almost the sole foundation of the rural economy—if no clinical evidence of disease was present and merely because they were reactors.]

—W. K. DUNSCOMBE.

SHETLAR, M. R., SHETLAR, C. L., PAYNE, R. W., NEHER, G. M. & SWENSON, C. B. (1958). **Serum protein and glycoprotein alteration in swine with experimental arthritis.** — *Proc. Soc. exp. Biol., N.Y.* **98,** 254-256. [Authors' summary modified.] **3838**

A serial study was made of protein and glycoprotein changes of pigs during arthritis which sometimes follows recovery from swine erysipelas. As in sera from human beings with rheumatoid arthritis, elevated serum glycoprotein, seromucoid and serum globulins and lowered serum albumin concentrations were noted in pig sera during active phases of the disease. No serum alpha-1 globulin was identified in pig sera. During remissions of experimental arthritis, serum glycoprotein levels decreased and the serum albumin increased. Cortisone treatment of animals with active arthritis produced clinical improvement accompanied by striking increases of albumin protein with de-

creases of seromucoid, serum gamma-globulin protein and gamma-globulin bound hexose concentrations.

SIKES, D. (1958). **A comparison of rheumatoid-like arthritis in swine and rheumatoid arthritis in man.**—*Ann. N.Y. Acad. Sci.* **70,** 717-725. [Author's summary modified.] **3839**

The pathology of *Erysipelothrix rhusiopathiae* infections in pigs is described, the major pathological changes of the joints in rheumatoid arthritis in man are discussed, and the pathology of *E. rhusiopathiae* arthritis in pigs is compared with that of rheumatoid arthritis in man.

SEELIGER, H. P. R. (1958). Die Serodiagnostik der Listeriose. [**Serological diagnosis of listeriosis.**]—*Zbl. VetMed.* Suppl. No. 1. pp. 20-34. Discussion: pp. 35-36. [English summary.] **3840**

S. dealt chiefly with the serology of human infections. However the large animals often show natural anti-*E. monocytogenes* antibodies in their sera. There are common antigens with human and animal corynebacteria, and c.f. tests using a thermolabile polysaccharide antigen showed a marked group reaction between Types 1 and 2, and *Staph. aureus*. He emphasized the importance of serology and immunobiology in veterinary practice. The Widal test is occasionally negative when the c.f. test is not, so with a properly prepared antigen the c.f. test is an indispensable adjunct to the Widal, but all serological tests must be viewed in conjunction with the clinical picture. A c.f. titre higher than 1:10 suggests active infection, as does an agglutination titre higher than 1:320. A titre of 1:640 is considered definite. In discussion, Linsert referred to the symptomless course which often occurs in sheep. Gray advised caution in interpreting the serological findings in habitual abortion and mentioned the possible filtrable form. All agreed that isolation of the organism is the only certain diagnosis.

—W. K. DUNSCOMBE.

DEDIÉ, K. (1958). Weitere experimentelle und Untersuchungsbefunde zur Listeriose bei Tieren. [**Further results of experiment and investigation in listeriosis of animals.**]—*Zbl. VetMed.* Suppl. No. 1. pp. 99-106. Discussion: pp. 106-109. [English summary.] **3841**

D. described agglutination, typing, and epidemiological investigations on a number of horses, sheep, and pigs. In horses and sheep natural agglutinins up to 1:160 occur while in Borna disease infections titres against *E. monocytogenes* antigen of up to 1:320 may be found, hence agglutination was unreliable. As regards typing, different strains may be found in the same flock and even in the same sheep. Listeriosis was commonest in sheep up to 2 years old, and between December and May. Artificially infected ewes secreted the organism from the udder for more than 2½ years; but after artificial infection of a cow the organism was not isolated from the milk. Wild rodents and ruminants and probably their ticks may be carriers. *Listeria* in general behaves like corynebacteria, but the combination of all types of listeria under *Erysipelothrix* is not considered satisfactory. Morphologically there may be confusion with *C. diphtheriae* and *C. pyogenes* especially in udder secretions.

In discussion, Kampelmacher emphasized the danger of infection from raw milk, cream, cheese products; a sample from an infected cow's udder still showed live organisms after 7 months in a refrigerator, but ordinary pasteurization probably kills.

There was danger of listeria infection to veterinarians and meat inspectors.

—W. K. DUNSCOMBE.

FLAMM, H. (1958). Die Pathogenese der Listeriose. [**Pathogenesis of listeriosis.**] — *Zbl. VetMed.* Suppl. No. 1. pp. 61-67. Discussion: pp. 67-69. [English summary.] **3842**

F. emphasized the lack of knowledge of the epidemiology of the infection, and suggested that the organism could be (a) a saprophyte; (b) the cause of local disease processes; (c) the cause of sepsis in the host's body. The virulence of the organism was very important; after entry into the body it was disseminated by lymph. The rarity of severe *E. monocytogenes* sepsis both in man and in large animals in spite of a bacteraemia was due to a high general resistance. The c.n.s. was the least resistant part, but in certain animals the genito-urinary system was sensitive, as in pregnancy.The foetus was infected transplacentally but there appeared to be a listeria toxin which may cause abortion. Histologically there are 2 forms (a) miliary bacillary-toxic necroses; and (b) miliary granulomata, mainly composed of proliferating cells.

In discussion Schabinski criticized the hypothesis of a toxin acting on the uterus, as many other organisms had a tendency to cause abortion. Gray felt the best explanation of the encephalitis was the penetration of the organism through small wounds of the face, nose or ear with transmission along the branches of the trigeminal nerve to the medulla oblongata; and mentioned also the possibility of arthropod bites, and the role of wild and domestic rodents.

—W. K. DUNSCOMBE.

I. Popov, V. I. (1957). **[Epidemiology of listeriosis in pigs.]**—*Sborn. Rabot vsesoyuz. Inst. eksp. Vet.* pp. 58-67. [In Russian.] **3843**

II. Yashenkina, M. I. (1957). **[Serological diagnosis of listeriosis in pigs.]**—*Ibid.* pp. 68-79. [In Russian.] **3844**

I. The disease was studied on 19 farms in 3 regions. Incidence was highest in pigs aged between 40 and 70 days: of 1,019 cases, 168 were unweaned, 613 were newly-weaned piglets, 212 were fattening pigs and 26 were adults. On 15 of the farms feeding and management were poor; rats and mice were prevalent on all farms. A piglet from an uninfected farm developed the disease 15 days after transfer to an infected farm. The main sources of infection were affected pigs, carrier pigs, and infected food. The organism was isolated from poor quality millers' waste, and experiments revealed that it could remain alive for 103-134 days in food stored in the dark at temp. ranging from −4° to +15°C. Convalescent pigs may remain carriers for 120 days.

II. A strain of *E. monocytogenes* was found which possessed good agglutinability without a tendency to auto-agglutinate. Antigen prepared from this strain was suitable for agglutination tests on pig sera. In experimental infection of piglets, agglutination tests first became positive 6 days after infection. Titres reached a peak between 40 and 50 days after infection, and tests became negative after 90 days. Tests on sera from 200 pigs on farms believed to be uninfected and from pigs with Aujeszky's disease, swine fever and erysipelas all gave negative results. 3,000 tests were performed on sera from infected farms, and titres of 1:100 and above were regarded as positive.—R.M.

Pallaske, G. (1958). Pathologische Anatomie der Listeriose, besonders beim Tier. **[Pathological anatomy of listeriosis, especially in animals.]**—*Zbl. VetMed.* Suppl. No. 1. pp. 49-58. Discussion: pp. 59-60. [English summary.] **3845**

P. stated that in animals there were 2 main forms of listeriosis (1) an encephalitis closely resembling that due to Borna disease virus, and (2) a metritis which occurs in calves as well in adult cattle. Abortion often takes place both in sheep and cattle. In pigs the main form is an encephalitis and the differential diagnosis from Teschen disease and swine fever is important. In horses the encephalitis must be differentiated from Borna disease, and in dogs, foxes and mink from distemper encephalitis. In the brain macroscopically the changes are not characteristic, but histologically there are definite changes affecting principally the brain-stem with virus-like vascular or peri-vascular cuffing and multiple small foci with a tendency to necrosis. Septic metritis seldom occurs in sheep, and in cattle the abortion does not lead to much disturbance of the dam. In fowls whitish-yellow foci occur in the myocardium, while in a subacute form the lesions may resemble those of *Salmonella pullorum* infection. In all animals pregnancy is often a predisposing factor. There is a marked similarity between human and animal forms.

The possible portals of entry are, the nasopharynx, tonsils, lungs, and the intestinal lymphatic system; after entry the infection usually spreads *via* the lymphatic vessels and the bloodstream.

In discussion, Hartwigk pointed out that the organism can be found in the kidneys. Seeliger suggested that the organism is really a soil saprophyte which, given the right conditions, becomes pathogenic for man and animals. Gray mentioned a possible *E. monocytogenes* toxin, and that the most characteristic lesion was a focal necrosis best developed in the liver of monogastric animals and in the brain of ruminants.—W. K. Dunscombe.

Hartwigk, H. (1958). Morphologische und kulturelle Eigenschaften von Listeria monocytogenes (L.m.). **[Morphological and cultural properties of *Listeria monocytogenes*.]**—*Zbl. VetMed.* Suppl. No. 1. pp. 5-16. Discussion: pp. 16-19. [English summary.] **3846**

H. compared 10 strains of *E. monocytogenes* with other Gram-positive organisms, chiefly corynebacteria. Morphologically there was often a close resemblance but the diplococcoid form was very typical of *E. monocytogenes*, though there were often gross variations in size. The filamentous forms were mostly R-forms. In Gram-staining it was essential to use Lugol's iodine for washing off, and not water. Biochemical reactions were essential for differentiation. In glucose broth there was a sharp fall in the pH after 2 days at either 20° or 37°C., but not with *C. diphtheriae*. The methyl-red test was always positive after 4 days. In discussion, Seeliger stated that the organism was always motile but the methyl-red test was not decisive and the Voges-Proskauer test was very definite. Gray mentioned that refrigeration of suspected material for some days or weeks helped in the isolation of the organism; he mentioned also possible L-forms. Hartwigk replying, again said that methyl red was always positive, and Voges-Proskauer not so definite. The organism was catalase-positive. On 0·3%

agar with 1% glucose "swarming" occurred, but not with other comparable organisms.

—W. K. DUNSCOMBE.

ROOTS, E. (1958). Die Zellwand von Listeria monocytogenes. **[The cell wall of *Listeria monocytogenes*.]**—*Zbl. VetMed.* Suppl. No. 1. pp. 45-46. [In English pp. 46-48.] Discussion: p. 48. **3847**

R. stated that the cell wall of *E. monocytogenes* is much less resistant to mechanical shaking with glass beads than those of brucella or salmonella. It is also more sensitive to trypsin and the nucleases, especially ribonuclease. A suitable preparation of the cell wall with which tests of the antigen components can be carried out was obtained after treatment with ether, shaking with glass beads for 4 hours, and digestion with trypsin, ribonuclease and deoxyribonuclease. A pure preparation was obtained. Replying to questions raised in discussion, R. stated that the phospholipid molecular complex isolated from Gram-negative organisms probably plays a role in their resistance to toxic substances, but no such complex has been isolated so far from Gram-positive organisms.

—W. K. DUNSCOMBE.

KING, N. B., GALE, C., SMITH, H. R., HAMDY, A. H., SANGER, V. L., POUNDEN, W. D. & KLOSTERMAN, E. W. (1958). **Stress factors in shipping fever.**—*Vet. Med.* **53**, 67-72. **3848**

Of doubtful aetiology and estimated to cost the U.S.A. $25,000,000 yearly in morbidity alone, this widespread condition is characterized by depression, anorexia, dyspnoea, scouring, nasal and ocular discharge, with temperatures up to 107°F.

Prophylaxis by haemorrhagic septicaemia serum is of very doubtful value. Work at the Ohio Agricultural Station indicates that long-acting penicillin-streptomycin injection prior to loading, and repeated if necessary after arrival, is more efficient, and may be supplemented by sulphonamide therapy. Much greater attention should be paid to improving the speed, sanitation and comfort of transit, and to the reduction of fatigue, fear and distress.—J. PASFIELD.

CARTER, G. R. (1958). **Failure of the agglutination test to identify types of *Pasteurella multocida*.**—*Nature, Lond.* **181**, 1138. **3849**

Because of inagglutinability due to capsulation, and spontaneous clumping in the presence of NaCl, the slide and tube agglutination tests were unreliable in the identification of serological types of *Past. septica*. Until these difficulties are overcome, it is recommended that the use of the serological classification of Little and Lyon be suspended.—M.G.G.

DAS, M. S. (1958). **Studies on *Pasteurella septica* (*Pasteurella multocida*). Observations on some biophysical characters.**—*J. comp. Path.* **68**, 288-294. [Author's conclusions modified.] **3850**

A new selective culture medium was evolved for the isolation of *Past. septica*. 49 strains from field cases of pasteurellosis in cattle, buffalo, sheep, goats and poultry were tested for sugar fermentation. Viability in blood was tested on various substrates at room temp., at 37°C. and at cold room temp. The antagonism of certain common contaminating bacteria, such as *B. subtilis*, streptococcus, staphylococcus, corynebacterium and *Escherichia coli*, was studied. The behaviour of *Past. septica* after serial growth in gradually increasing atmospheres of carbon dioxide is reported.

SMITH, J. E. (1958). **Studies on *Pasteurella septica*. II. Some cultural and biochemical properties of strains from different host species.** — *J. comp. Path.* **68**, 315-323. [Author's conclusions modified.] **3851**

Past. septica strains from a variety of animal sources showed certain cultural and biochemical differences. Strains from lung lesions in pigs usually produced mucoid colonies containing much hyaluronic acid. They were visibly capsulated, iridescent, not agglutinable by acid and highly pathogenic for mice, fermenting xylose, sorbitol, mannitol and sometimes trehalose but rarely maltose or dextrin. Strains from cattle generally produced non-mucoid colonies containing little or no hyaluronic acid; in other respects they resembled those from pigs. Dog strains produced non-mucoid colonies containing little or no hyaluronic acid. They were usually non-capsulated, non-iridescent, agglutinable by acid or saline and of little or no pathogenicity for mice; trehalose and sometimes maltose and dextrin were usually fermented. Cat strains usually fermented mannitol, and though non-iridescent and apparently non-capsulated, were generally highly pathogenic for mice. Minor differences in fermentative ability were observed between strains from healthy and diseased animals of the same species.

COGHLAN, J. D. (1958). **Isolation of *Pasteurella multocida* from human peritoneal pus and a study of its relationship to other strains of the same species.**—*J. Path. Bact.* **76**, 45-53. [Author's summary modified.] **3852**

A strain of *Past. septica* (*Past. multocida*)

No. 074 B was isolated as the sole organism from peritoneal pus from a case of acute appendicitis. It was compared with a strain isolated from another case of appendicitis and with 23 *Past. septica* strains obtained from the National Collection of Type Cultures, and 12 strains isolated from dogs' mouths.

The two appendicitis strains and one of the dog strains appeared to be identical.

Strain 074 B and 5 strains derived from a variety of animal sources were found to be closely related. 074 B was agglutinated by 18 out of 33 dog sera to a degree which suggests that these animals had been previously infected with similar organisms.

MILAKOVIĆ, L. (1958). Neka svojstva Pseudomonas aeruginosa izoliranih iz sperme bikova. **[Some characteristics of *Pseudomonas aeruginosa* isolated from bull semen.]** — *Vet. Arhiv.* **28,** 106-110. [In Croat. Summaries in English and German.] **3853**

Carbohydrate fermentation was studied in 14 strains of *Ps. pyocyanea*, isolated from ejaculates of 12 of 17 bulls, none of which had clin. symptoms or lesions of any kind. Six of these strains killed mice 24–72 hours after infection, but of 28 infected g.pigs only one died.—E.G.

ROCHA, H., GUZE, L. B., FREEDMAN, L. R. & BEESON, P. B. (1958). **Experimental pyelonephritis. III. The influence of localized injury in different parts of the kidney on susceptibility to bacillary infection.**—*Yale J. Biol. Med.* **30,** 341-354. **3854**

Coliform bacteria, although commonly associated with clinical pyelonephritis, are incapable of establishing pyelonephritis in experimental animals when injected intravenously and are not excreted into the urine. It was found that injury to the renal medulla of the rabbit followed by i/v inoculation of *E. coli* led to acute pyelonephritis in approx. 85% of instances, whereas similar lesions in the cortex did not. Spontaneous development of infection in kidneys with medullary injury was not observed. The means by which medullary injury increases the susceptibility of kidney tissue to bacterial infection is thought to be related to obstruction of collecting tubules, but the exact mechanism is not obvious. —R.M.

PROHÁSZKA, L. & MURÁNYI, F. (1958). A szerin szerepe az Escherichia coli-törzsek anyagcseréjében. **[Role of serine in the metabolism of *Escherichia coli.*]** — *Mag. állator. Lapja* **13,** 127-129. [In Hungarian. Summaries in English and Russian.] **3855**

220 strains of *E. coli* were cultivated in various synthetic fluid media, each containing one of 21 amino-acids. Glutamic acid, aspartic acid, asparagine and alpha-alanine were able to serve as N and C sources to all strains. 123 of the 220 strains were able to grow in serine medium and split serine, producing pyruvic acid and ammonia. With the addition of pyruvic acid to the serine medium, the remaining 97 strains, which lacked the serine-splitting enzymes, could be propagated too. None of the serine-splitting strains could ferment saccharose, which indicates that the two respective enzyme-systems exclude each other. No intermediate behaviour in serine-splitting activity was observed; consequently this is considered a useful means of classification of strains.—A. SEBESTENY.

QUESADA, A. & CALAPRICE, A. (1958). Il ruolo del gallo nella diffusione della pullurosi—Nota I: Ricerche sierologiche e batteriologiche su otto ceppi di *B. pullorum* isolati da galli riproduttori. **[Role of cocks in the spread of *Salmonella pullorum* infection. I. Serological and bacteriological study of strains isolated from cocks.]**—*Atti Soc. ital. Sci. vet., Rimini-Ravenna* 1957. **11,** 863-867. [Summaries in French and German.] **3856**

Serum from 25 cocks from infected flocks was subjected to the agglutination test (slow and rapid) at fortnightly intervals during five months; semen samples were examined bacteriologically. Results of slow agglutination were: 8 constantly positive; 5 alternately positive and negative; 8 initially negative and subsequently positive; 4 constantly negative. In rapid agglutination all were positive in the first two tests; 11 remained positive throughout; 6 were alternately positive and negative; the remaining 8 were negative. *S. pullorum* was repeatedly, though not constantly, isolated from 8 of the semen samples.—T.E.G.R.

QUESADA, A., CALAPRICE, A. & ACONE, P. (1958). Infezione per via cloacale di pollastre vergini con ceppi di *S. pullorum* isolati dal liquido seminale di galli. **[Experimental infection of pullets with *Salmonella pullorum* by the cloacal route.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 868-870. [Summaries in French and German.] **3857**

An emulsion of *S. pullorum* (isolated from the semen of 8 of 25 cocks from an infected flock) was instilled into the cloacae of 16 healthy pullets. Agglutinins were demonstrable in the blood on the 6th day and eventually reached a titre of 1:640. During the 13th–25th days 8 of the pullets died. Pathological and bacteriological examinations were negative in three while in the

remaining five there were specific lesions and *S. pullorum* was isolated in pure culture from various organs. The survivors were killed 60 days after infection and pathological and bacteriological examinations were negative.

—T.E.G.R.

FRAS, A., ORLIĆ, N. & ZELJKO, M. (1958). Epizootija Salmonella typhimurium kod kokoši u jednom peradarstvu. [*Salmonella typhi-murium* **infection in fowls.**] — *Vet. Arhiv* **28,** 86-94. [In Croat. Summaries in English and German.] **3858**

Of 8,850 serum samples 1,177 yielded positive tube agglutination reactions against *S. typhimurium,* 162 against *S. gallinarum,* and 87 against both *S. typhi-murium* and *S. gallinarum* antigens.

Of 1,683 samples from fowls kept in a confined space 1,008 reacted to *S. typhi-murium.* After improvement of conditions on this farm, 10 of 377 samples, taken at random, reacted to *S. typhi-murium* and one to *S. gallinarum.*

—E.G.

MUNDT, J. O. & TUGWELL, R. L. (1958). **The relationship of the chicken egg to selected paratyphoids.** — *Poult. Sci.* **37,** 415-420. [Authors' summary modified.] **3859**

Pullets were infected orally or i/v with 6 species of *Salmonella.* The disease was severe in a group of 60 birds infected i/v, causing severe diarrhoea and one death. No organisms were recovered from the contents of 1,728 eggs cultured during the 2 to 3 weeks after inoculation. The organisms were recovered from the shells of eggs laid by the most severely infected group 24 days after infection, and from faeces 35 days after infection. It is concluded that infection of egg contents with these organisms by the infected hen is improbable; and that egg shells are contaminated with *Salmonella* spp. in the cloaca or when they come into contact with a contaminated surface.

BELDING, R. C. & MAYER, M. L. (1958). **Furazolidone in the treatment of salmonella infections of turkeys. 2. Effect on acute paratyphoid infection in poults.** — *Poult. Sci.* **37,** 463-467. [Authors' conclusions modified.] **3860**

Furazolidone added to the food reduced mortality due to *S. san diego* by 50% when treatment began immediately after oral inoculation. A combination of chlortetracycline and sulphadimidine had no appreciable effect on mortality. In untreated poults 50% were carriers 13 weeks after infection. In poults treated with chlortetracycline and sulphadimidine or furazolidone, about 16% were carriers. Birds receiving furazolidone grew better than those treated with chlortetracycline and sulphadimidine. The tube agglutination test did not detect more than a third of the infected birds.

ROEPKE, M. H., STILES, F. C., JR. & DRIVER, F. C. (1958). **A summary of the studies in Minnesota on the whey plate test for the diagnosis of bovine brucellosis.**—*Proc. 61st. Ann. Meet. U.S. live Stk sanit. Ass.,* St. Louis, 1957 pp. 118-126. [Authors' summary modified.] **3861**

Of 292 cattle positive to blood agglutination tests for brucellosis, 62 (21%) were negative to the whey plate test. Brucella organisms were isolated from 15 of these 62 animals. Blood and whey plate tests were made on 1,289 lactating cows in 51 herds containing 88 reactors to the blood test and in 22 herds containing animals suspicious to the ring test and negative or suspicious to the blood test. There were 21 animals positive to the blood test but negative to the whey test, compared with 2 animals negative to the blood test but positive to the whey test. It appears that the whey plate test is not satisfactory as an official diagnostic test for bovine brucellosis in Minnesota.

BLUM, J. (1958). Verhalten der Seren von drei mit dem Stamm Buck 19 vakzinierten Rindern in Bezug auf Refraktion, Viskosität, Labilität, Papierelektrophorese und Abortus Bang-Schnellagglutination. [**Some physical and chemical properties and agglutinin content of sera from three cattle inoculated with** *Br. abortus* **Strain 19.**]—*Schweiz. Arch. Tierheilk.* **100,** 103-123. [Summaries in English, French and Italian.] **3862**

An extensive series of tests on serum (refraction, viscosity, "lability," protein electrophoresis, rapid agglutination, and antigen fixation of the proteins separated by paper electrophoresis) was carried out on 3 young animals aged 16, 14 and 10 months after vaccination with *Br. abortus* Strain 19. There was a rise in the refractive index, and in the total proteins especially the gamma-globulins with fixation of the brucella antigen on the protein, mainly the gamma-3 globulin. The sera of all 3 animals gave a positive agglutination reaction 5 days after vaccination. The author considers that:– (a) several weeks are necessary before the infection due to vaccination is overcome; (b) the stable agglutinins are true antibodies, while the labile agglutinins are possibly associated with local tissue immunity. He suggests that by the above serum tests it may be possible to separate those animals

which are active carriers and therefore potential excretors, from those positive due to vaccination, or cured of brucellosis.—W. K. DUNSCOMBE.

FRACASSO, B. (1958). La lotta contro la brucellosi in Friuli. Nota II. **[Control of brucellosis in Friuli, Italy. II.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 820-824. [Summaries in English and French. For Part I, see *V.B.* **26,** 2798.] **3863**

In a survey of over 50,000 herds in the Province of Udine milk samples from each herd were subjected to the ring test. The cows in infected herds were then subjected to the agglutination test, reactors were slaughtered and the premises were disinfected. A second survey, a year later, revealed a decrease of infection from 1·23% to 0·42% among plains cattle and from 6·6% to 2·13% among mountain cattle. —T.E.G.R.

PEGREFFI, G. (1958). Sull'azione vaccinante delle *Br. Abortus* Bang devitalizzate mediante antibiotici nella cavia. **[Immunizing properties of *Br. abortus* attenuated by means of antibiotics.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 824-828. [Summaries in English and French.] **3864**

The immunizing power of a *Br. melitensis* vaccine (inactivated by chlortetracycline and heat [see *V.B.* **25,** 2710 and **26,** 3396]) was tested on g.pigs challenged with *Br. abortus;* results were negative. Similar tests with three vaccines prepared in a similar way from *Br. abortus* gave inconclusive results. All the controls and eight of the nine test animals died. Bacteriological examination of the blood and bone-marrow of the vaccinated g.pigs was negative; this suggested that infection did not establish itself in the vaccinated g.pigs and that death was caused by a toxin released by lysis of *Br. abortus*. In a further test 18 g.pigs were vaccinated (with *Br. abortus* vaccines) and, with three controls, were challenged 30 days later by intracardial injection of *Br. abortus*. The controls and nine of the vaccinated g.pigs died. Colonies of *Br. abortus* were obtained from the bone-marrow, spleen and heart blood of five of the vaccinated g.pigs (abscesses, on the pleura and pericardium, and necrotic foci in the spleen or kidneys were detected P.M.) The nine survivors were killed after 128 days. There were no P.M. findings and bacteriological examination of bone-marrow, spleen and heart blood was negative. In these animals agglutination titres on the 105th day varied between 1:2,560 and 1:10,240.—T.E.G.R.

HAJDU, Š. (1958). Poznatky z tlmenia brucelózy hovädzieho dobytka a ošípaných vo vel'kochovoch. **[Control of brucellosis in cattle and pigs.]**—*Vet. Čas.* **7,** 21-31. [In Slovak. Summaries in English, French, German and Russian.] **3865**

Control of brucellosis in a farm of 1,200 cattle and 180 sows by culling of reactors to the agglutination, complement fixation, and Coombs test was described. Details were given of vaccination with Strain 19 and of serologically demonstrable infection and vaccination antibodies. The Coombs test was considered a most reliable and quick method of diagnosis.—E.G.

FREEMAN, B. A. & VANA, L. R. (1958). **Host-parasite relationships in brucellosis. I. Infection of normal guinea pig macrophages in tissue culture.**—*J. infect. Dis.* **102,** 258-267. [Authors' summary modified.] **3866**

Brucella organisms were grown within normal g.pig mononuclear phagocytes in tissue culture. Low numbers of brucella were capable of infecting a macrophage culture and multiplying extensively. No lag phase was observed, even with an inoculum as low as 80 cells and from a culture in the maximum stationary phase.

Although the brucella cultures used probably represented a relatively wide range of virulence as indicated by their species and dissociative state, no consistent correlation was observed between virulence and growth rate.

NIŽNÁNSKY, F., GMITTER, J. & OFÚKANÝ, L. (1958). Biologické vlastnosti brucelových kmeňov izolovaných v ČSR. II. Časť. Ich výskyt u zajacov na Slovensku a výsledky typizácie. **[Biological properties of brucella strains isolated in Czechoslovakia. II. Typing of strains isolated from hares in Slovakia.]**—*Vet. Čas.* **7,** 3-17. [In Slovak. Summaries in English, French, German and Russian.] **3867**

During 1951–57 brucellosis in hares was reported from 27 game preserves in Slovakia. The infection was present in about 6% of 1100 hares examined at the Bratislava veterinary institute and details of lesions are given. The disease occurred in districts where incidence of bovine and porcine infection was high, but also in those where it was almost absent. A detailed study was made of 15 strains; with the exception of one atypical *Br. suis* strain, all were identified as *Br. suis*, var. America. [See also *V.B.* **26,** 2082.]—E.G.

JONES, L. M., THOMSON, P. D. & ALTON, G. G. (1958). **Production of immunity against**

experimental *Br. melitensis* infection in goats. A comparison of two killed and one living vaccine. — *J. comp. Path.* **68,** 275-287. [Authors' conclusions modified.] **3868**

The efficacy of 3 *Br. melitensis* vaccines, (1) a killed rough culture in adjuvant, (2) a killed smooth culture in adjuvant and (3) a living avirulent strain, in protecting non-pregnant goats from challenge with graded doses of virulent *Br. melitensis* was determined by P.M. and bacteriological examination of tissues 4 weeks after infection. Although differences in the $I.D._{50}$ of the 3 vaccines were not significant the living vaccine was the most effective in preventing a generalized infection.

GARGANI, G. (1958). **Experiences performed at Italian brucellosis center about a killed, adsorbed, anti-*Br. melitensis*.** — *Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 295-303. [In English.] **3869**

A killed vaccine was prepared from cultures of *Br. melitensis* Strain 16m (Bethesda) by alternate freezing and thawing from −30° to +40°C. for 20 times. After contact with formaldehyde, the culture was adsorbed on potassium aluminium phosphate. Tests on g.pigs revealed that the immunizing properties of this vaccine were not superior to those of formolized vaccine, but the agglutinin titres of inoculated animals rapidly diminished after a month. G. suggested that the vaccine would be suitable for use in sheep.—R.M.

TORRES GOST, J. (1958). **Action of novobiocin in Malta fever.** In *"Antibiotics Annual"* 1957-58. pp. 915-919. [New York: Medical Encyclopedia Inc.] **3870**

Good results were claimed for treatment of *Br. melitensis* infection in human beings in Spain with novobiocin, administered by mouth in 0·25 g. doses at 4-hourly intervals for 6 or 7 days. The author mentioned that the drug was being tested on a large scale in infected goats. —R.M.

RENOUX, G. (1958). Préparation et contrôle de quelques vaccins applicables aux brucelloses animales. **[Preparation and control of some vaccines applicable to brucellosis in animals.]** —*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 305-315. [In French.] **3871**

A review, with reference to Strain 19 vaccine and the killed adjuvant vaccine prepared from *Br. melitensis* Strain 53 H 38 at the Institut Pasteur de Tunis. [See also *V.B.* **28,** 1706.] —R.M.

NIŽNÁNSKY, F., DUCHOŇ, T., KRČMÉRY, V. & FERENČÍK, M. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. I. Poznatky o metabolických reakciách. **[Effect of antibiotics on the metabolism of brucella strains. I. Metabolic reactions.]**—*Vet. Čas.* **7,** 165-175. [In Slovak. Summaries in English, French, German and Russian.] **3872**

DUCHOŇ, T., NIŽNÁNSKY, F., FERENČÍK, M. & KRČMÉRY, V. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. II. Účinok penicilínu. **[Effect of antibiotics on the metabolism of brucella strains. II. Penicillin.]**—*Ibid.* 176-186. [In Slovak. Summaries in English, French, German and Russian.] **3873**

KRČMÉRY, V., NIŽNÁNSKY, F., DUCHOŇ, T. & FERENČÍK, M. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. III. Účinok streptomycínu. **[Effect of antibiotics on the metabolism of brucella strains. III. Streptomycin.]**—*Ibid.* 227-236. [In Slovak. Summaries in English, French, German and Russian.] **3874**

NIŽNÁNSKY, F., FERENČÍK, M. & KRČMÉRY, V. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. IV. Účinok chlórtetracyklínu (aureomycínu). **[Effect of antibiotics on the metabolism of brucella strains. IV. Chlortetracycline.]** — *Ibid.* 237-252. [In Slovak. Summaries in English, French, German and Russian.] **3875**

FERENČÍK, M., KRČMÉRY, V., NIŽNÁNSKY, F. & DUCHOŇ, T. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. **[Effect of some antibacterial substances on the metabolism of brucella strains. V. Effect of chloramphenicol.]** — *Ibid.* 354-361. [In Slovak. Summaries in English, French, German and Russian.] **3876**

KRČMÉRY, V., FERENČÍK, M., DUCHOŇ, T. & NIŽNÁNSKY, F. (1958). Vplyv antibakteriálnych látok na metabolizmus brucelových kmeňov. VI. Účinok bacitracínu. **[Effect of antibacterial substances on the metabolism of Brucella strains. VI. Effect of bacitracin.]**—*Ibid.* 362-369. [In Slovak. Summaries in English, French, German and Russian.] **3877**

I. Antibiotics produced certain differences in the metabolism of amino-acids by *Brucella abortus, Br. suis. Br. melitensis* and *Br. intermedia*. Utilization of alanine, asparagine, serine and of some intermediate metabolic carbohydrate products was increased. Metabolism of *l*-arabinose was more intensive than that of

d-arabinose, and *l*-serine was metabolized rapidly, *dl*-serine not at all.

II. Penicillin reduced utilization of glucose, pyruvate, lactate, asparagine and serine, particularly in *Br. suis* cultures. Penicillin sensitivity did not appear to be related to penicillinase activity. The effect of penicillin became apparent 2½–3 hours after its addition to the medium, later when at lower conc., and much sooner in the presence of sulphonamides. Sulphonamides, however, increased the effect of penicillin only slightly.

III. Streptomycin inhibited metabolic reactions to a lesser degree than chloramphenicol and tetracycline. It reduced utilization of glucose, pyruvate, lactate, alanine, asparagine and serine. There were, however, differences within the brucella types. Streptomycin stimulated pyruvate utilization in *Br. suis, Br. melitensis and Br. intermedia,* but had practically no influence on glucose and lactate utilization in *Br. abortus.* The inhibitory effect of streptomycin was apparent after a comparatively short time. As a rule, high concentrations of streptomycin were less effective than medium and low ones. Combination with sulphonamides had either a slightly higher or no inhibitory effect.

IV. In conc. of 40 μg./ml. chlortetracycline completely inhibited metabolic reactions in brucella, the effect of the antibiotic being apparent even in conc. as low as 0·05 μg./ml. Inhibitory effect persisted for 12 hours. *Br. melitensis* was most, *Br. suis* least sensitive. Streptomycin and sulphonamides in low conc. which were practically ineffective, greatly enhanced the inhibitory effect of equally low conc. of chlortetracycline, but no such synergism was observed with higher conc. of chlortetracycline.

V. Although chloramphenicol affected the metabolic processes of brucella strains and the endogenous respiration of resting brucella cells, its effect was less pronounced than that of the tetracyclines, at least under experimental conditions. *Br. melitensis* appeared to be particularly susceptible. Penicillin had a moderate synergic effect on chloramphenicol.

VI. The variability of the effect of bacitracin on the metabolic processes in brucella strains appeared to indicate its inefficacy against this group. In one *Br. melitensis* strain it produced a decrease in glucose, pyruvate, alanine, asparagine and serine utilization, whereas in another *Br. melitensis* strain, in *Br. abortus* and *Br. suis* it appeared to stimulate these reactions. Penicillin antagonized the stimulating effect of bacitracin. Bacitracin did not influence the inhibitory effect of chloramphenicol but antagonized that of chlortetracycline. The inhibitory effect of chloramphenicol plus streptomycin was further increased by the addition of bacitracin. —E.G.

OLITZKI, A. L. & SULITZEANU, D. (1958). **The antigenic structure in the genus brucella.** —*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 321-324. [In English. Authors' summary.] **3878**

By the aid of the agar diffusion technique at least six precipitation lines were regularly reproduced and an additional diffuse line (7 or D) appeared in a hyperimmune serum. Furthermore, three additional sharp lines (I, II, III) appeared in an immune serum prepared with the aid of Freund's adjuvant. A strong precipitation line (M) appeared in the reaction zone between *Br. suis* immune serum and *Br. melitensis* antigen.

Absorption of immune serum by whole bacteria killed by acetone removed lines 4, 5 and 6, but did not remove lines 1, 2 and 3, indicating that these antigens are not situated on the surface, but in deeper layers of the bacterium.

GERHARDT, P. (1958). **The nutrition of brucellae.** —*Bact. Rev.* **22,** 81-98. **3879**

In this review of the nutrition of brucella, the development of media, both undefined and chemically defined, which have been used for their cultivation are first outlined and then the basic requirements of inorganic materials, accessory growth factors, oxygen, carbon dioxide, and other physico-chemical factors, and suitable nitrogen, carbon and energy sources are considered. The nutritional basis for population changes involving genetically altered types is discussed and the principles applicable to primary isolation, mass propagation, and preservation of vitality are outlined.—A. ACKROYD.

HENGL, R., KASZA, L. & KEMENES, F. (1958). A tejelő tehenek elapasztása (tőgygyulladása) leptospirosis következtében. [**Leptospiral mastitis in cows.**] — *Mag. állator. Lapja* **13,** 33-37. [In Hungarian. Summaries in English and Russian.] **3880**

A study of infections of cattle with *Leptospira pomona* and *L. hyos* respectively revealed that, in adult cattle of 4½–9 years, the only manifestation of the disease was a mastitis lasting for a few days after a short febrile period. The disease was reproduced experimentally in a cow yielding 5 litres of milk daily; the organism was

demonstrable in the milk for a few days only, later settling in the kidneys for a longer period. The otherwise spontaneous recovery was hastened by parenteral penicillin.—A. SEBESTENY.

FENNESTAD, K. L. & BORG-PETERSEN, C. (1958). **Fetal leptospirosis and abortion in cattle.**—*J. infect. Dis.* **102,** 227-236. [Authors' summary modified.] **3881**

Abortion in infected cows is usually due to the expulsion of a foetus that has died from foetal leptospirosis. The interval of 2–5 weeks most often observed between exposure of the dam and abortion may be explained by the two consecutive infections involved.

The interval between foetal death from leptospirosis and expulsion often exceeds the survival-time of leptospires in the dead foetus *in utero,* particularly in heifers. The use of silver-impregnation methods often permits the demonstration of leptospires, viable or non-viable, in aborted foetal material. Occasionally, bovine foetuses are able to produce specific antibodies and survive intra-uterine leptospirosis in the 8th–9th month of pregnancy.

MCDONALD, N. R. & RUDGE, J. M. (1958). **Interpretation of findings in leptospirosis.** — *N. Z. vet. J.* **6,** 59-60. **3882**

The criticisms by W. M. Webster (*N.Z.vet. J.* **6,** 27) of the evidence for leptospirosis in 5 experimental control calves reported in the authors' recent paper [*V.B.* **28,** 2424] are refuted. The agglutination-lysis test should not be used as a major criterion of leptospira infection in very young calves as poor serological responses to inoculation are not unknown, whilst Webster's statement that leptospira are rarely found in the urine for the first time later than the 21st day of the disease could be misleading as the host species is not stated. The advantages of bright-field examination of stained urinary sediment over direct dark-ground microscopy are open to question as the organisms are killed. —A. ACKROYD.

POKORNÝ, B., LEHKÝ, F., ŠEBEK, Z. & VOŠTA, J. (1958). Weitere neue Leptospirenträger in Böhmen. **[More carriers of leptospirosis in Bohemia.]** — *Zbl. Bakt. I. (Orig.)* **172,** 135-141. [Summaries in English, French, Spanish and Russian.] **3883**

Antibodies to *L. grippo-typhosa* were found in sera from 2 of 24 water shrews (*Neomys fodiens*), 8 of 118 common shrews (*Sorex araneus*), 6 of 73 muskrats (*Ondatra zibethica*) and 6 of 50 water voles (*Arvicola terrestris*). Positive titres were also found in sera from a few moles, hedgehogs, weasels, polecats, foxes, deer and hares.—R.M.

HOWARTH, J. A. & REINA-GUERRA, M. (1958). **Comparative studies on experimental avian leptospirosis.**—*J. infect. Dis.* **102,** 268-274. [Authors' summary modified.] **3884**

Direct visual measurement of leptospires in plasma seven days after exposure was used to determine the infectivity of *L. pomona, canicola,* and *icterohaemorrhagiae* for 2-day-old chicks under varied experimental conditions. The considerable variation of response to inoculation was referable to the serotype and route of inoculation used. Infection with all serotypes was enhanced by X-rays and fasting. Chicks inoculated at this age did not exhibit clinical symptoms, leptospiraemia being the only indication of infection.

GALTON, M. M., MENGES, R. W. & STEELE, J. H. (1958). **Epidemiological patterns of leptospirosis.**—*Ann. N.Y. Acad. Sci.* **70,** 427-444. [Authors' summary modified.] **3885**

Leptospiral infections occur in wild and domestic animals throughout the world. There is a characteristic epidemiological pattern. All leptospires known to infect animals are potentially pathogenic for man. While some serotypes exhibit a certain host preference, all of the more common types infect more than one animal species. During the past two years, 5 serotypes hitherto unrecognized in the U.S.A. have been detected in wild mammals there. Of primary importance in the chain of transmission are the animal carriers. After acute, mild, or even inapparent infections the organisms are shed in the urine for varying periods. These carriers serve as foci of infection for other animals and man. In the U.S.A. outbreaks in man are associated primarily with swimming in stagnant water presumably contaminated by carrier animals. Sporadic cases are usually associated with occupational exposure in veterinarians, abattoir and sewer workers, dog owners, and others. Information on 94 such cases in the U.S.A. is presented. These outbreaks and sporadic cases are discussed, and compared with the epidemiology of leptospiral infections in other countries.

MOSKOWITZ, M. (1958). **Mode of action of chelates in protecting against *Clostridium perfringens* toxin.**—*Nature, Lond.* **181,** 550-551. **3886**

Mice were inoculated i/d with 2·5%, 5%, or 30% solutions of calcium ethylenediamine tetraacetic acid, and at varying intervals there-

after with *Cl. welchii* toxin. The protective effect of the 2·5% soln. lasted about 30 min., that of the 5% soln. about 2 hours, and that of the 30% soln. about 9 hours. In a second trial the toxin was injected before the chelate. The mice survived if the chelate was given not later than 6 hours after the toxin,and most of them died if it was given 8 to 10 hours after the toxin. It is considered that the chelate inhibits the toxin, possibly by binding the free trace metals available in the body. The toxin is then inactivated by some mechanism in the body.—M.G.G.

MOUSSA, R. S. (1958). **Antigenic formulae for the genus** *Clostridium*.—*Nature, Lond.* **181,** 123-124. **3887**

Antigenic formulae, by Mandia & Bruner [*J. Immunol.* **67,** 497 (1951)], and by Mandia [*J. Immunol.* **67,** 49 (1951); **69,** 45 (1952), & *J. infect. Dis.*, **90,** 48 (1952)], for *Clostridium sporogenes, Cl. histolyticum* and *Cl. parabotulinum* were restricted to the heat-labile antigens and excluded the *O*- and the spore- (*S*-) antigens. The opinion is expressed that all classification within the genus *Clostridium* should be based on antigenic characters and that the use of antigenic formulae comprising the *S*-, *O*- and *H*- antigens would simplify identification and overcome the difficulty of antigenic overlapping between the different species.—T.E.G.R.

PENSO, G. & VICARI, G. (1958). **Immunological phenomena studied by the tissue culture method.**—*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 11-29. [In English.] **3888**

The authors described the action of toxins of diphtheria, staphylococci, *Clostridium tetani, histolyticum, septicum,* and *oedematiens* on tissue cultures of various types of cell, and discussed the advantages of titration of toxins and antisera by the use of tissue culture rather than lab. animals.—R.M.

VETÖ, I., BACKHAUSZ, R. & HORVATH, I. (1958). **Investigation of** *Clostridium-welchii, septicum* **and** *oedematiens* **toxins in tissue cultures.**—*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 33-41. [In English. Authors' summary modified.] **3889**

Larger doses of *Cl. welchii, oedematiens* and *septicum* toxins destroy, smaller doses check, and minimum doses promote the growth of heart-fibroblast cultures of chick embryos rolled in tubes.

The authors characterize the potency of the toxins by that dose (CT_{50}) which—with reference to the controls—reduces tissue growth by half.

Antitoxin solutions are capable of neutralizing toxins specifically and in accordance with the law of multiplicity. Therefore, if a sufficient number of cultures is used, the tissue-culture method appears to be suitable for determining the value of clostridial toxins and antitoxins.

CONTINI, A. & LEI, G. M. (1958). Congiuntivite difteroide contagiosa dei polli di probabile natura spirillare. **[Contagious conjunctivitis of fowls probably caused by a spirillum.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 834-837. [Summaries in English and French.] **3890**

A form of contagious conjunctivitis occurred in two flocks, 150 chickens (15%) being affected. The disease did not spread to other flocks and responded to treatment with terramycin. Clinically it was characterized by a false membrane adhering to the mucosa which was haemorrhagic and dotted with small yellowish white nodules. Microscopic examination of the membrane and scrapings of the conjunctiva revealed a spirillum which organism was not demonstrable in the blood or organs. Attempts to culture the organism failed. The disease was reproduced in one of three groups of four chickens each by scarification with material from infected birds and the spirillum was demonstrated microscopically in the lesions.

—T.E.G.R.

DRURY, A. R. (1958). **Antibiotic sensitivity tests of mastitis causing bacteria.**—*Vet. Med.* **53,** 354-355. **3891**

The sensitivity to various antibiotics of the organisms isolated from 100 milk samples from cows with mastitis varied considerably. Alone penicillin, the tetracyclines and streptomycin appeared to be the most consistently effective, about 25% of the organisms being resistant in each case. An antibiotic combination, "Special Formula 17900" (hydrocortisone acetate 20 mg., neomycin sulphate 250 mg., procaine penicillin 250,000 units, polymyxin B sulphate 50,000 units, and chlorobutanol 50 mg. in each 10 ml.) was 88% effective. Only one organism, a *Pseudomonas,* was completely resistant to all antibiotics.—A. ACKROYD.

PRICE, K. E., ZOLLI, Z., JR., GALLIAN, M. J. & SHEA, G. J. (1958). **Comparison of antibacterial activity of mastitis therapeutic agents by an in vitro method.** In *"Antibiotics Annual"* 1957-58. pp. 279-285. [New York:

Medical Encyclopedia Inc.] [Authors' summary modified.] **3892**

Antibacterial activity in milk and broth was compared for 14 proprietary preparations containing single or combined antibiotics and other drugs. Products containing penicillin, the tetracyclines, erythromycin or combinations of these antibiotics were the most effective in milk against streptococci and staphylococci. With *Pseudomonas* and *Escherichia* strains, only a small number of products brought about demonstrable inhibition in milk. Preparations containing both oxytetracycline and polymyxin B were most active; those containing chlortetracycline, dihydrostreptomycin, streptomycin, or mercury showed some activity; and those containing nitrofurazone, sulphonamides, or tyrothricin were essentially inactive. Type of vehicle influenced rate of release of antibacterial agent into the medium. In descending order of activity the vehicles were: water, milk, vegetable oil base, mineral oil or petrolatum base.

I. Burke, J. F. & Miles, A. A. (1958). **The sequence of vascular events in early infective inflammation.**—*J. Path. Bact.* **76**, 1-19. **3893**

II. Miles, A. A. & Miles, E. M. (1958). **The state of lymphatic capillaries in acute inflammatory lesions.**—*Ibid.* 21-35. [Authors' summaries modified.] **3894**

I. Capillary permeability and stickiness of the capillary endothelium, the accumulation of polymorphonuclear leucocytes in the tissues, and the patency of blood and lymphatic vessels, were studied at intervals up to 6 hours after intradermal infection of g.pigs with graded doses of nine different pathogens.

In six infections, by *Staph. aureus, Str. pyogenes, Corynebact. ovis, Cl. welchii, Ps. pyocyanea* and *E. coli,* the time-course of the vascular reactions was remarkably similar. With moderate doses of bacteria, capillary permeability and endothelial stickiness increased and decreased in parallel, in two phases. In the first phase there was a transient increase during the first half hour; in the second, a larger increase, both in area and intensity, maximum at 3–4 hours.

Proteus vulgaris, Corynebact. diphtheriae and *E. monocytogenes* induced a similar diphasic response, except that in the proteus infection the diameter of the mature lesion was only 6/10ths of that indicated by increased permeability, whereas in the other two infections, it was 2–3 times that indicated by increased permeability.

The absence of any striking inflammatory reaction during the first hour, when, according to previous investigations, the inoculated bacteria are most rapidly rendered ineffective, and the occurrence of periods of low capillary permeability during an apparent continuing extravascular accumulation of blood elements, both warrant a re-examination of the relation of vascular permeability phenomena to effective defence against local infection.

II. Inflammatory reactions occurring 1-9 days after i/d inj. of turpentine, *P. vulgaris* endotoxin, *C. diphtheriae* toxin, and *Cl. welchii* alpha-toxin, and of living *Cl. welchii, Staph. aureus* and a pyogenic coccobacillus, were investigated in the ear of the mouse. Reactions after one day to *Staph. aureus* and *Str. pyogenes* were studied in the ear of the g.pig.

The evidence contradicts the hypothesis of lymphatic blockade as an effective defence mechanism in the decisive stages of reaction to a primary lodgment of bacteria, if the blockade is understood to be an obstruction to the movement of pathogens from a local lesion to the lymph nodes interposed between the nodes and the actively infected tissues. The trapping of living pathogens in the central region of an infective focus, where lymphatic occlusion occurs as part of a generalized coagulative necrosis of the tissues, may have some defensive value; but the lymphatic events in such a region do not constitute a blockade.

Fisher, M. W. & Manning, M. C. (1958). **Studies on the immunotherapy of bacterial infections. I. The comparative effectiveness of human γ-globulin against various bacterial species in mice.** — *J. Immunol.* **81**, 29-31. [Authors' summary modified.] **3895**

Pooled human gamma globulin exhibited therapeutic activity in mouse infections induced with a variety of bacteria. In order of decreasing susceptibility were *Staph. aureus, Ps. pyocyanea, Proteus vulgaris, E. coli, Str. salivarius, pyogenes* and *pneumoniae.* Slight activity was noted against *Salmonella typhi-murium.* The bacteria not affected by globulin were *Klebsiella pneumoniae, Past. septica* and streptococci of Group C. These findings appear to be consistent with the concept that normal antibodies are responsible for the described *in vivo* activity of gamma globulin.

Sheldon, W. H. & Bauer, H. (1958). **Activation of quiescent mucormycotic granulomata in rabbits by induction of acute alloxan diabetes.** — *J. exp. Med.* **108**, 171-178. [Authors' summary.] **3896**

In normal rabbits subcutaneous granulo-

mata produced by the injection of a spore suspension of *Rhizopus oryzae* remained confined to the site of inoculation, showed no fungus proliferation, no longer yielded the agent on culture 10 weeks after inoculation, and eventually healed. Similar well established granulomata in rabbits with acute alloxan diabetes induced 8, 10, and 15 days after injection of the fungus uniformly showed activation of the infection. This occurred only in animals showing acetonuria. In these animals the skin lesions showed proliferation of the fungus frequently associated with invasion and early necrosis of the granuloma wall. In some instances, spread of the infection to adjacent tissues with invasion of blood vessels had occurred. These experiments illustrate that changes in host metabolism can activate a preexisting quiescent infection.

MADDY, K. T. (1958). **Disseminated coccidioidomycosis of the dog.**—*J. Amer. vet. med. Ass.* **132,** 483-489. **3897**

M. describes disseminated coccidioidomycosis in 100 dogs, observed between 1954 and 1956 in Arizona, where the disease is endemic in man and cattle. The symptoms and P.M. findings are described and illustrated. It is likely that the incidence of dissemination is higher in the dog than in man. Bone lesions are common and tend to be more proliferative than in man. Since some of the dogs had large numbers of sporangia in their saliva, urine, faeces and wound exudates, and since these produce mycelia and infective arthrospores within a few days, it is possible that infected dogs might be a source of infection for their owners.

—E. G. WHITE.

HUGENHOLTZ, P. G., REED, R. E., MADDY, K. T., TRAUTMAN, R. J. & BARGER, J. D. (1958). **Experimental coccidioidomycosis in dogs.**—*Amer. J. vet. Res.* **19,** 433-439. **3898**

Dogs were given doses of *C. immitis* arthrospores ranging from a thousand to a million by intratracheal insufflation in order to study the pathogenesis of the disease. Observations included testing with coccidioidin, complement-fixation tests, radiographic study, biopsy and autopsy. There were no pathognomonic symptoms: fever, cough, listlessness and loss of weight were the only signs. Following the formation of granulomata in the lungs, the infection spread to the abdominal viscera. Complement-fixing antibody appeared within 28–36 days but precipitins could not be detected. Skin sensitivity did not appear until 112 days after infection. The radiographic findings are illustrated.—E. G. WHITE.

YOUNG, G. (1958). **The process of invasion and the persistence of *Candida albicans* injected intraperitoneally into mice.**—*J. infect. Dis.* **102,** 114-120. **3899**

When the yeast form of *C. albicans* was injected i/p into mice 60% of the organisms developed pseudomycelia within an hour. Whereas the yeast forms were ingested by phagocytes, the mycelia survived and had invaded the pancreas after two hours. The more virulent strains persisted in the peritoneal cavity for up to one month. Kidney cultures were positive for as long as six months and macroscopic lesions were present in most of such animals. The mycelial, rather than the yeast phase, seems to be the infective form of *C. albicans* under these conditions; it invades the pancreas from the peritoneal cavity, and then reaches the kidneys by the bloodstream, where it persists for a long time. Survival of mice in acute experiments is thus not a good criterion of virulence of the organism.—E. G. WHITE.

CARLISLE, H. N. & SASLAW, S. (1958). **A histoplasmin-latex agglutination test. I. Results with animal sera.**—*J. Lab. clin. Med.* **51,** 793-801. [Authors' summary modified.] **3900**

A new serological technique for the detection of antibodies against *H. capsulatum* is presented. In the performance of this technique, polystyrene latex particles are "coated" with histoplasmin and used in a simple tube agglutination test. The histoplasmin-latex agglutination test and the histoplasmin-collodion agglutination test were of comparable specificity and sensitivity with sera from infected dogs and monkeys and immunized rabbits.

FORGÁCS, B. & SZOVÁTAY, G. (1958). Az actinomycosis kezelése új injekciós készítménnyel. **[Treatment of actinomycosis by injection of a mercury–arsenic–sodium iodide compound.]** —*Mag. állator. Lapja* **13,** 101-102. [In Hungarian. Summaries in English and Russian.] **3901**

For the treatment of actinomycosis a mixture of biniodide of mercury (2·0 g.), sodium iodide (5·0 g.), sodium benzoate (3·0 g.), liquor arsenicalis (30·0 ml.), and distilled water (*ad.* 100·0 ml.) was injected into the wall or immediate neighbourhood of the lesion in 5-ml. doses at 3 day intervals and cured a large proportion of cattle and pigs treated. Injection into the cavity of the abscess had no result.—A. SEBESTENY.

AWAD, F. I. (1958). **The inter-relationship between tuberculosis and bovine farcy.**—*J. comp. Path.* **68,** 324-330. [Author's conclusions modified.] **3902**

Macroscopical and microscopical examinations are not sufficient to distinguish bovine farcy from TB. The best method is g.pig inoculation. Experiments in calves and g.pigs show that *Actinomyces farcinicus* [*Nocardia farcinica*] may sensitize animals to avian or mammalian tuberculin or both. Affected animals respond irregularly to tuberculin and the absence of a reaction does not exclude bovine farcy. The single intradermal comparative tuberculin test should be applied wherever bovine farcy is known to exist, and reactors should be re-tested after 60 days.

SANFORD, J. P., HATTEN, B. E. & FORDTRAN, J. S. (1958). **Effectiveness of novobiocin and cycloserine on *Nocardia asteroides*. Preliminary evaluation in vitro and in vivo.** In *"Antibiotics Annual"* 1957-58. pp. 22-26. [New York: Medical Encyclopedia Inc.] **3903**

Tests *in vitro* indicated that erythromycin and novobiocin were the most active of 8 antibiotics against *N. asteroides,* while cycloserine was inactive. But tests on mice revealed that only cycloserine decreased the severity of visceral nocardia infection.—R.M.

PROVOST, A. (1958). Recherches immunologiques sur la péripneumonie. 2e partie: Relations sérologiques entre le virus vaccinal et *Mycoplasma mycoïdes*. **[Immunological studies of bovine contagious pleuropneumonia. II. Serological relationship with vaccinia virus.]**—*Rev. Élev.* **11,** 5-10. [Summaries in English and Spanish.] **3904**

The c.f. and rapid slide agglutination tests were used for a comparative study of the serum of cattle vaccinated against cow pox and that of cattle immunized against bovine contagious pleuro-pneumonia. There is an antigenic relationship between the two agents which may give rise to false positive reactions to the c.f. test but does not affect the specificity of the agglutination test.—T.E.G.R.

PEGREFFI, G., MURA, D. & CONTINI, A. (1958). La pleuropolmonite contagiosa degli ovini da microrganismi del gruppo pleuropolmonite contagiosa (P.P.L.O.). **[Ovine contagious pleuropneumonia caused by pleuropneumonia-like organisms.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 829-833. Discussion: p. 833. [Summaries in English and French.] **3905**

The disease affected sheep of both sexes and of any age with a mortality of 30–40% in adults and 85–90% in lambs aged 30–40 days. It occurred during autumn and winter after lambing. Clinically, it was subacute or chronic, characterized by anorexia, dulness, fever, profuse serous nasal discharge and marked dyspnoea. Sometimes keratitis in one eye and arthritis of the femoro-tibial joint were also present, Lesions included haemorrhagic tracheitis with white froth in the trachea and large bronchi, enlarged lymph nodes, adhesive pleurisy, red and grey hepatization of the lungs, haemorrhagic bronchitis, pericarditis, endocarditis, acute interstitial nephritis, gastro-intestinal catarrh and fatty degeneration of the liver. Microscopic findings are described. P.P.L.O. were isolated in culture on selective media. Inoculation of lab. animals with infected material or filtrate gave negative results but the disease was reproduced in lambs—from which P.P.L.O. were recovered in culture. One lamb which had not been inoculated developed the disease and died after having been in contact with an inoculated lamb. In discussion on the paper it was pointed out by one of the speakers that in Sicily a similar disease affected goats (but not sheep, even in mixed flocks) from which P.P.L.O. were isolated.

—T.E.G.R.

YAMAMOTO, R. & ADLER, H. E. (1958). **Characterization of pleuropneumonia-like organisms of avian origin. II. Cultural, biochemical, morphological and further serological studies.** — *J. infect. Dis.* **102,** 243-250. [Authors' summary modified.] **3906**

Seven strains of pleuropneumonia-like organisms of avian origin were separated into five groups according to their morphological, physiological, and antigenic characteristics.

I. SHELTON, D. C., OLSON, N. O. & WEAKLEY, C. E., JR. (1958). **Control of infectious synovitis. IV. Antibiotics and nitrofurans.**—*Poult. Sci.* **37,** 610-614. **3907**

II. OLSON, N. O. & SHELTON, D. C. (1958). **Control of infectious synovitis in chickens. VI. Chlortetracycline in field experiments.**—*J. Amer. vet. med. Ass.* **132,** 477-482. **3908**

III. SHELTON, D. C. & OLSON, N. O. (1958). **Control of infectious synovitis. IX. The efficacy of dihydrostreptomycin sulfate as related to the time of experimental infection.** In *"Antibiotics Annual"* 1957-58. pp. 272-278. [New York: Medical Encyclopedia Inc.] [Authors' summaries modified.] **3909**

I. Against the infectious synovitis agent, chlortetracycline had greater therapeutic value than oxytetracycline, and tetracycline less when given orally to chicks. Furazolidone was less effective than oxytetracycline. Furadantin, chloramphenicol and carbomycin had no thera-

peutic value. The characteristic swellings of the leg resulting from injection of the disease agent into the foot pad are described and classified numerically.

II. When chickens experimentally infected with infectious synovitis under controlled field conditions were continuously fed chlortetracycline, at 100 g. or more per ton of feed, starting before infection, only an occasional bird was affected. At 50 g. per ton of feed, the disease was clinically but not completely controlled. The pathogenicity of the inoculum influenced the therapeutic value of chlortetracycline. Age influenced the severity of the disease. Birds inoculated at 3 weeks of age grew more slowly than birds inoculated at 5 weeks. Severely infected birds responded slowly to chlortetracycline therapy.

III. Dihydrostreptomycin sulphate was 75 to 87% effective in controlling infectious synovitis at 55 mg./kg. body wt. when administered intramuscularly before signs of the disease appeared, while 110 mg./kg. treatment was 100% effective under conditions of this experiment. As the time after exposure and before medication increased from 0 to 4, 8, and 12 days, the development of the infection was progressively greater and the efficacy of the dihydrostreptomycin was greatly reduced. The drug was of little value once infectious synovitis was already established. Dihydrostreptomycin in oil was as effective as aqueous soln.

See also absts. **4062** (simultaneous ornithosis and salmonellosis in ducks and geese); **4067** (skin diseases affecting leather); **4127** (animal diseases transmissible to man).

DISEASES CAUSED BY PROTOZOAN PARASITES

STEPHEN, L. E. & MACKENZIE, C. P. (1958). ***Trypanosoma vivax* infection in a mare: treatment with ethidium bromide.**—*Vet. Rec.* **70,** 293-294. **3910**

Illness in an aged mare commenced with urticaria and was followed after 4 days by fever, anorexia and jaundice. Large numbers of *T. vivax* were present in stained blood smears. A single dose of ethidium bromide was injected i/m at 1 mg./kg. body wt. as a 2% aqueous solution. The mare rapidly recovered after the injection.—R.M.

CHANDLER, A. C. (1958). **Some considerations relative to the nature of immunity in *Trypanosoma lewisi* infections.**—*J. Parasit.* **44,** 129-135. [Author's summary modified.] **3911**

The demonstration that ablastin is an antibody directed against metabolic products, that this is the cause of agglutination as well as inhibition of reproduction of *T. lewisi,* and that immune serum loses most of its potency when absorbed with metabolic products, indicates that ablastin is primarily responsible for immunity and is also responsible for at least the first "number crisis," since agglutination is a precursor of phagocytic destruction of the parasites.

Inhibition of reproduction, which is effected by a lower titre of ablastin than is agglutination, is presumably due to neutralization by antibodies of excreted metabolic products, probably enzymes, which enable the parasites to avail themselves of some constituent or constituents of the environment that is required for growth and reproduction. The agglutination appears to be due to ablastin-ablastinogen combination in contact with the parasite bodies.

Many experiments of earlier workers which seemed to indicate separate reproduction-inhibiting and trypanocidal antibodies seem to be adequately explained by quantitative relationships between ablastin and ablastinogen.

The modifications in the course of *T. lewisi* infections resulting from deficiency of pantothenic acid and from administration of salicylates, demonstrated by Becker and his colleagues [*Iowa State Coll. J. Sci.* **21,** 237 & 351 (1957)], seem explicable on the basis of interference with antibody (ablastin)-production, whereas the effect of benzene demonstrated by Barnes (1951), like the effect of splenectomy and blockade demonstrated by Taliaferro (1938), seem explicable on the basis of partial interference with phagocytosis.

I THURSTON, J. P. (1958). **The oxygen uptake of *Trypanosoma lewisi* and *Trypanosoma equiperdum*, with especial reference to oxygen consumption in the presence of amino-acids.** —*Parasitology* **48,** 149-164. **3912**

II. THURSTON, J. P. (1958). **The effect of some metabolic inhibitors on the oxygen uptake of *Trypanosoma lewisi* and *Trypanosoma equiperdum*.** — *Ibid.* 165-183. [Author's summaries modified.] **3913**

I. Oxygen consumption was measured with differential manometers using microflasks containing $2–5 \times 10^7$ trypanosomes in 0·9 ml. of reaction mixture. Measurements of oxygen uptake were carried out at 37°C.

T. lewisi respired slowly in the absence of substrate for up to 2 hours. The trypanosomes suffered little damage when stored at 5°C. for 24 hr. without substrate. No oxygen uptake was observed with *T. equiperdum* in the absence of substrate. The trypanosomes were viable after

24 hr. at 5°C. with glucose or glycerol as substrate, but not in the absence of substrate.

With glucose as substrate, the rate of oxygen consumption by *T. lewisi* increased with the age of infection. This change was more marked with glutamine as substrate.

With glucosamine as substrate, the oxygen uptake of *T. lewisi* was at a slightly lower rate than with glucose. The rate of oxygen uptake was still lower with Na L-glutamic acid, asparagine, aspartic acid, casein hydrolysate, yeast extract and peptone. Thirteen other amino-acids had no effect on the motility of the trypanosomes.

With glycerol as substrate, the oxygen uptake of *T. equiperdum* was slightly lower than with glucose; it was very low with yeast extract, casein hydrolysate and peptone. No oxygen uptake or motility was recorded with glutamine, Na L-glutamic acid, glucosamine, asparagine, aspartic acid, DL-alanine, or Na acetate. Thirteen other amino-acids had no effect on the motility of the trypanosomes.

Ammonia was liberated from glutamine by adult and reproductive phase *T. lewisi*.

II. The oxygen uptake of trypanosomes in heparinized infected blood was compared with that of washed trypanosomes suspended in Ringer–phosphate–glucose (RPG) solution with or without added serum or blood. With *T. lewisi*, uptake began at a higher rate in the presence of blood or serum than with RPG soln. With *T. equiperdum*, the oxygen uptake in the presence of blood or serum began at almost the same rate as with RPG soln., but it decreased more rapidly in the absence of blood or serum than when it was present.

High concentrations of iodoacetic acid increased oxygen uptake when tipped into heparinized normal rat blood. Similar concentrations inhibited oxygen uptake when methylene blue was also present or when the blood had been treated with sodium nitrite to convert haemoglobin into methaemoglobin.

Iodoacetic acid caused little inhibition of oxygen uptake when *T. lewisi* was suspended in Ringer–phosphate soln. containing glutamine or glutamine plus glucose, or when heparinized infected blood was tested. Inhibition was greatest when the substrate was glucose, while glucosamine, glycerol, or glucose plus serum gave intermediate results.

Iodoacetic acid caused least inhibition of oxygen uptake when *T. equiperdum* was suspended in Ringer-phosphate soln. containing glycerol, or when heparinized infected blood was tested. Inhibition was greatest when the substrate was glucose, and was slightly less when the substrate was glucose plus serum or glucose plus glycerol.

Neoarsphenamine inhibited the oxygen uptake of *T. lewisi* to a similar extent whether glucose or glutamine was present.

Neoarsphenamine and reduced stovarsol thioglycolate inhibited the oxygen uptake of *T. equiperdum* slightly less when the substrate was glycerol than when it was glucose. Sodium arsenite was as active as reduced stovarsol thioglycolate when the substrate was glucose, but 10^{-4} sodium arsenite had little effect when the substrate was glycerol.

HAWKING, F. (1958). **The action of berenil on trypanosomes, including strains resistant to antrycide and to stilbamidine.** — *J. comp. Path.* **68,** 295-299. [Author's conclusions modified.] **3914**

Berenil (*pp'*-diamidinodiazoaminobenzene diaceturate) killed laboratory strains of *T. rhodesiense, T. equiperdum* and *T. congolense in vitro,* in a concentration of about 1:2 million at 35°C. in 20 hours. When it was injected i/m into rabbits the plasma was trypanocidal after 6 hours but not after 24 hours. In mice, it was more active against *T. congolense* than against *T. equiperdum*. The trypanocidal action took 6 to 48 hours to appear according to the dose, and during this period the infectivity of the trypanosomes for fresh mice was preserved. An antrycide-resistant strain of *T. equiperdum* was highly sensitive to Berenil, but a stilbamine-resistant strain of *T. rhodesiense* was completely resistant. The reactions of these strains to other drugs were investigated. The trypanocidal action of Berenil resembles that of the other diamidine compounds, which it also resembles in chemical structure.

ABRAMOV, I. V. & OTHERS. (1958). **[Practical experience of treating trichomoniasis in bulls.]** —*Veterinariya, Moscow* **35,** No. 2. pp. 35-40. [In Russian. English summary.] **3915**

Treatments tried and found to be ineffective were "bioquinol" intramuscularly combined with "iodanestozol" [iodine, an iodide, and proserine] applied to the prepuce; and suramin i/v combined with "tar" (1 part) in fish oil (2 parts) applied to the prepuce. The need for cultural methods in diagnosis and in assessing treatment was stressed.—R.M.

WEHR, E. E., FARR, M. M. & MCLOUGHLIN, D. K. (1958). **Chemotherapy of blackhead in poultry.** — *J. Amer. vet. med. Ass.* **132,** 439-445. **3916**

A review, with reference to the value of

phenothiazine for removing *Heterakis gallinae*, in addition to chemotherapy directed against *Histomonas meleagridis*.—R.M.

LUND, E. E. & BURTNER, R. H., JR. (1958). **Effect of four embryonation media on the embryonation and infectivity to chickens of *Histomonas*-bearing eggs of *Heterakis*.**—*J. Parasit.* **44**, 197-200. [Authors' summary modified.] **3917**

A study was made of the effects of physiological saline, 1·5% nitric acid, 10% formalin, and 2·0% potassium dichromate, on the embryonation of *Heterakis* eggs, the subsequent development of the worms in chickens fed eggs so cultured, and the ability of the eggs or worms to transmit *Histomonas*. Sixty birds were used to test eggs embryonated in each of the four media.

Solution of potassium dichromate permitted satisfactory embryonation (28·6%) in 19 days at room temp. However, the number of worms recovered from chickens fed these eggs averaged less than 1% of the number of embryonated eggs administered, and infections with *Histomonas* were detected in only 8·5% of 47 birds killed and examined 17 to 63 days after each had received 155 embryonated *Heterakis* eggs.

Physiological saline, nitric acid, and formalin permitted embryonation of 27·3%, 25·2%, and 31·0% of the eggs, respectively. Worm recovery from eggs embryonated in these media was comparable, and for the 3 groups combined, it averaged 74·3% in chickens killed at 10 and 11 days, 45·1% in those killed at 63 days, and 54·4% for those killed at all periods of observation. *Histomonas* infections were detected with comparable frequency following administration of *Heterakis* eggs embryonated in any one of these three media. Of 142 chickens examined 17 to 63 days after each had received orally 155 embryonated *Heterakis* eggs, 89·4% were found to harbour *Histomonas*.

LUND, E. E. (1958). **Growth and development of *Heterakis gallinae* in turkeys and chickens infected with *Histomonas meleagridis*.** — *J. Parasit.* **44**, 297-301. [Author's summary modified.] **3918**

The rate of growth in length of *Heterakis gallinae* was studied in turkeys and fowls, some of which had clinical blackhead. Rates of growth of worms in the 2 hosts were similar.

Caeca with clinical evidences of blackhead had fewer worms than normal caeca. In turkeys half of the diseased caeca had no worms, and the remainder had less than half as many worms as the average for normal caeca. In fowls a similar situation prevailed, but was more difficult to assess accurately because fowls recovered so rapidly that evidence of the disease was often quickly obliterated.

In turkeys the length of female worms from caeca showing clinical blackhead averaged 5·6% less than that of worms from normal caeca. Male worms from diseased caeca showed no consistent retardation. Blackhead in chickens was associated with retardation in female worm length of 5·1%, and less than 2% in male worm length.

Worm counts give a satisfactory indication of egg intake and soil pollution by birds which are not advanced cases of clinical blackhead. Worm length can be used to establish the time of infection only if living, intact individuals are measured.

Histomonad infections which do not provoke macroscopic caecal changes do not influence worm counts or worm lengths, but the prevalence of such infections is a rough indication of soil pollution with *Heterakis* eggs infected with histomonads.

MCGUIRE, W. C. & MOREHOUSE, N. F. (1958). **Blood-induced blackhead.**—*J. Parasit.* **44**, 292-296. [Authors' summary modified.] **3919**

Fatal blackhead was produced in 7 of 28 susceptible turkeys by inoculating citrated whole blood from veins draining the caeca of diseased birds into the wing veins. This produced typical lesions in the liver with atypical involvement of lungs, kidneys, heart, spleen, pancreas and proventriculus, but in no instance were the caeca or any portion of the lower intestinal tract involved. *H. meleagridis* was demonstrated in the liver and in these unusual tissue sites but no histomonads were observed from fresh or stained samples of the blood used for inoculation.

These results appear to offer indirect evidence of the passage of the protozoan from the caeca to the liver through the hepatic portal system. The liver apparently acts as an efficient filter for these organisms, usually preventing establishment in other suitable tissue sites when infection proceeds by natural routes.

HORTON-SMITH, C. (1958). **Coccidiosis in domestic mammals.** — *Vet. Rec.* **70**, 256-262. **3920**

The common coccidia of domestic and laboratory animals are enumerated, with clinical and post-mortem signs. The author stresses that careful clinical appraisal is necessary in assessing the significance of faecal oocysts, and that chemotherapy does not replace good hygiene

Sulphadimidine is the drug of choice against *E. bovis* and *E. zurnii* of cattle, though dapsone, phthalylsulphathiazole, mepacrine hydrochlor-

ide, sulphaquinoxaline and sulphaguanidine are effective, as is nitrofurazone against coccidiosis of pigs, sheep and goats. Sulphonamides are probably of value in laboratory animals.

—J. PASFIELD.

HAMMOND, D. M., CLARK, G. W., MINER, M. L., TROST, W. A. & JOHNSON, A. E. (1958). **Experimental low-level and single-dose treatment of bovine coccidiosis.** — *J. Parasit.* **44,** No. 4 Sect. 2 pp. 37-38. [Authors' abst. modified.] **3921**

In 6 experiments involving 92 calves the efficacy of low-level and single-dose administration of sulphadimidine and sulphabromomethazine in controlling coccidiosis was tested on groups of 4 animals each, inoculated with 100,000 to 1,000,000 oocysts, chiefly *E. bovis;* 2 or 3 groups were variously treated with the sulphonamides administered in gelatin capsules. Either drug controlled coccidiosis when given in a single dose on the 13th day after inoculation at the rate of 1·5 grains per pound body wt., or when given on alternate days beginning as late as 10 days after inoculation and continuing for at least 8 days at 0·02 g./kg. Treated calves discharged relatively few oocysts and showed only mild symptoms or none at all, while untreated controls had severe infections. In one experiment in which a single treatment was given on the 14th day after inoculation, the calves treated with sulphabromomethazine exhibited relatively severe symptoms of coccidiosis while those treated with sulphadimidine did not.

LUCAS, J. M. S. (1958). **The effect of nicarbazin on growth rate, sexual maturity, egg production, fertility and hatchability.**—*J. comp. Path.* **68,** 300-307. [Author's conclusions modified.] **3922**

Nicarbazin, given to chickens at a dietary concentration of 0·0125% wt./wt., had no adverse effect on growth and sexual maturity. When fed for the first 13 weeks of life, nicarbazin did not affect subsequent egg production, fertility or hatchability.

When fed to laying birds, production, fertility and hatchability were reduced and egg yolks were mottled. Administration of nicarbazin should be confined to the rearing period.

RIKIMARU, M. T., GALYSH, F. T. & SHUMARD, R. F. (1958). **Some pharmacological aspects of a toxic substance found in the oocyst of the coccidian,** *Eimeria tenella.*—*J. Parasit.* **44,** No. 4. Sect. 2. p. 20. **3923**

A toxic substance from oocysts of *E. tenella* killed rabbits when injected i/v. Changes observed in injected rabbits were hyperthermia, irregularities in blood pressure and electrocardiograph, hyperglycaemia followed by hypoglycaemia, and a significant increase in the rate of oxygen uptake of isolated rabbit brain tissue.

—R.M.

JOYNER, L. P. (1958). **Experimental** *Eimeria mitis* **infections in chickens.**—*Parasitology* **48,** 101-112. [Author's summary modified.] **3924**

Methods are described for the isolation and maintenance of a pure strain of *E. mitis.*

The prepatent period in chicks was 101 hours. The mean dimensions of the oocysts were 15·38 × 13·83μ, and sporulation occurred after 48 hr. at 15·5°C.

When 500,000 or more oocysts were given to chicks aged 6, 17 or 26 days the growth rate was markedly reduced. Young chicks were most susceptible and a few deaths occurred when 6-day-old chicks received 2·5 million oocysts. *E. mitis* is unlikely to be pathogenic under conditions of good husbandry. Lesions were not found in sections of intestinal tissues. Developmental stages were found throughout the small intestine.

The growth-retarding effects and oocyst production by *E. mitis* were controlled when 0·2% sodium sulphadimidine was given in the drinking water.

DAVIES, S. F. M. (1958). **Value of interrupted treatments and preventive medication in the control of intestinal coccidiosis caused by** *Eimeria necatrix.*—*J. comp. Path.* **68,** 363-373. [Author's conclusions modified.] **3925**

The 3—2—3 type of interrupted treatment, *i.e.,* 3 days of treatment, followed by an interval of 2 days, then a further 3 days of treatment, with the sulphonamides, sulphadimidine or sulphaquinoxaline was partly effective in the control of experimental intestinal coccidiosis caused by *E. necatrix,* but better results were obtained when an additional 3-day period of treatment was given after a further interval of 2 days. When a mild infection was established good control was obtained with concentrations of the sulphonamides lower than those recommended for the control of *E. tenella.* It is suggested that better control of intestinal coccidiosis in the field may follow the use of these lower concentrations for the extended 3—2—3—2—3 schedule of interrupted treatment.

Nicarbazin at 0·0125% was more effective than nitrofurazone at 0·01% in preventing intestinal coccidiosis caused by *E. necatrix.* Provided treatment started before infection took place,

nicarbazin prevented the appearance of symptoms and allowed a steady gain in weight and the development of strong resistance.

GÜRALP, N. & URMAN, H. K. (1957). Koyunlarımızda tesbit ettiğimiz Globidium gilruthi Chatton, 1910 olayları. [*Globidium gilruthi* **in sheep in Turkey.**]—*Vet. Fak. Derg.* **4,** 131-144. [In Turkish. Abst. from English summary.] **3926**

Globidium gilruthi cysts were present in the region of the cardia and fundus of the abomasum in 108 of 110 sheep examined at Ankara.—E.G.

LESSER, E. (1958). **Modification of the formalin-ether fecal concentration technique for use with swine feces.** — *J. Parasit.* **44,** 318-323. **3927**

The routine sugar flotation techniques as employed to detect coccidial oocysts were found to be unsuitable for levitating other protozoan cysts in pig faeces. Therefore, the formalin-ether technique [Ritchie (1948) *Bull, U.S. Army Med. Dept.* **8,** 326] normally used for human faecal examination was employed, and with certain modifications found to be satisfactory.—R.M.

BISHOP, A. (1958). **An analysis of the development of resistance to metachloridine in clones of** *Plasmodium gallinaceum.* — *Parasitology* **48,** 210-234. [Author's summary modified.] **3928**

The development of resistance to metachloridine (3-metanilamido-5-chloropyrimidine) was studied in two clones of *Pl. gallinaceum* derived from single erythrocytic parasites and maintained by inoculation in chicks. Resistance developed with equal facility in the two clones.

In 13 strains of these clones an enhancement of resistance was obtained after three to five courses of treatment, each consisting of seven doses of metachloridine added at intervals of 12 hours. Although the number of courses of treatment required to enhance resistance was not always related to the size of the inoculum, with the largest inoculum an enhancement of resistance was observed after the minimum number of courses of treatment (three), whereas with the smallest inoculum no enhancement of resistance was obtained. The rate of development of resistance did not appear to be related to the dose of drug. In some strains the increase in resistance was sudden, whereas in others it was more gradual. Resistance was retained when parasites of a newly resistant strain were transmitted through *Aedes aegypti* or maintained for 43 days in the absence of the drug.

DAVIES, S. F. M., JOYNER, L. P. & KENDALL, S. B. (1958). **Studies on** *Babesia divergens* **(M'Fadyean and Stockman, 1911).**—*Ann. trop. Med. Parasit.* **52,** 206-215. [Authors' summary modified.] **3929**

A species of *Babesia* from a field case in cattle in Gt. Britain was maintained by syringe passage. The parasites could be distinguished morphologically from specimens of *Babesia* obtained from cattle in Yugoslavia, and it is suggested that the name *Babesia divergens* should be retained for the species of *Babesia* in cattle in Gt. Britain. The relationship between parasitaemia, body temp., and pathological changes in the blood was studied. The effects are recorded of the age of the animal, of splenectomy before and after infection, and of inocula of different volumes of carrier blood. The duration of infection, the occurrence of relapses, and resistance to re-infection were studied. [See also *V.B.* **28,** 738].

HALAŠA, M. (1958). Príspevok k epizootológii piroplazmóz hovädzieho dobytka na Slovensku. [**Epidemiology of bovine piroplasmosis in Slovakia.**]—*Vet. Čas.* **7,** 274-282. [In Slovak. Summaries in French, German and Russian.] **3930**

Piroplasmosis in cattle in Slovakia caused by *Babesia bigemina, B. bovis* and *Françaiella caucasica,* and incidence, specificity, identification and biology of tick vectors were discussed. —E.G.

ILLÉŠ, J. (1958). Naše skúsenosti s hubením kliešťov na dobytku. [**Eradication of ticks in the control of bovine piroplasmosis.**]—*Vet. Čas.* **7,** 287-289. [In Slovak. Summaries in English, French, German and Russian.] **3931**

Annual incidence of piroplasmosis in cattle in a district of Slovakia was reduced from an average of 150–200 over the last 30 years, to 12 in 1957, by control of ticks on cattle with a benzene hexachloride preparation, applied by brush, twice at an interval of two weeks. About 2,100 cattle were treated.—E.G.

ČERNÝ, V. & LIPLICH, L. (1958). Prvé zjištění onemocnění texaskou horečkou skotu na území ČSR. [**Texas fever in Czechoslovakia.**] —*Vet. Čas.* **7,** 160-164. [In Czech. Summaries in English, French, German and Russian.] **3932**

Babesia bigemina was isolated from two cows in a district of Slovakia. Both recovered following inj. into the dewlap of 6 ml. of quinuronium sulphate, followed by 20 ml. of caffein s/c. Texas fever had not been reported

before from Czechoslovakia. The morphology of the parasite was described.—E.G.

CARDASSIS, J. (1958). Valeur et indications de la thérapeutique paraspécifique dans les piroplasmoses bovines. **[Non-specific therapy in bovine piroplasmosis.]**—*Rec. Méd. vét.* **134,** 453-466. [Summaries in English and Spanish.] **3933**

A discussion based on the literature and the author's experiences in Greece. Treatments recommended were hypertonic glucose soln., a soln. of 0·4% sodium bicarbonate in physiological saline, or calcium gluconate administtered intravenously; and cardiac stimulants.

—R.M.

DE KOCK, G. (1957). **Studies on the lesions and pathogenesis of East Coast fever (*Theileria parva* infection) in cattle, with special reference to the lymphoid tissue.**—*Onderstepoort J. vet. Res.* **27,** 431-452. **3934**

Regressive changes brought about by the development of *Th. parva* in lymphoid tissue were the striking pathological features of East Coast fever. The large immature lymphocytic cells appeared to be primarily involved in the earliest development of the schizont, causing a change in the appearance and distribution of the cell types of the lymph node. Lesions in the lymphoid tissue varied from slight changes, such as a depletion of the lymphocytic cells, to severe damage to the lymphoid tissue.

Imprint smears of lymph nodes, made at various stages of the disease, revealed interesting changes, and before death the majority of immature and mature lymphocytic cells were infected with schizonts.

Regular and frequently extensive aggregates of lymphocytic cells appeared in such organs as kidney, liver, adrenal gland. The "stem cells" present in the vascular tissue in these organs were apparently stimulated *in situ* to form a reticulum and aggregates of lymphocytic cells. The disintegration and the much reduced function of the primary lymphoid depots, probably provoked a compensatory formation of lymphocytic cells in such organs as the kidney, liver, etc. Schizonts freed in the primary lesions of lymphoid tissue were carried away in the circulation, and also infected newly-formed lymphocytic cells in these organs.

In the later stages of the disease, the gamonts apparently become disseminated into the so-called merocytes, responsible for the infection of the erythrocytes. During the final stages of the disease most red cells were usually parasitized, but only with slight morphological changes in these cells. The nature of the icterus observed in uncomplicated cases could not be explained. No abnormal pigmentation was observed in liver and neither did spleen reveal an abnormal erythrophagocytosis and haemosiderosis.

Much attention has lately been paid to the function of the lymphocytic and lymphoid tissue. It would appear that the extensive destruction and elimination of lymphocytic cells in East Coast fever interfered with a vital function in the animal body, resulting in the rapid wasting and emaciation characteristic of this disease, and the subsequent death of the animal.

NEITZ, W. O. (1957). **Theileriosis, gonderioses and cytauxzoonoses : A review.**—*Onderstepoort J. vet. Res.* **27,** 275-430. [Author's abst. modified.] **3935**

An historical review of the literature dealing with the above-mentioned diseases over a period of 25 years is given. For easy reference each disease is considered under the heads of definition, distribution, aetiology, transmission, epizootology, pathogenicity, pathogenesis, symptoms, pathology, diagnosis, treatment, prophylaxis and immunity. At the end of each chapter the relevant literature is cited.

The discussion as a whole gives a readable summary and interpretation of work conducted in different countries. Attention is drawn to the increasing difficulty in distinguishing the various species in cattle; xenodiagosis may have to be resorted to for determining their identity.

For the sake of completeness the species of *Theileria, Gonderia* and *Cytauxzoon* of wild animals are listed. In the majority of cases only the endoglobular parasites have been encountered. The microorganisms have been included provisionally in the genera *Theileria* or *Gonderia* but their true generic status can only be established when the vertebrate life-cycle has been determined.

A detailed account of the chemotherapeutic studies is given. Of the numerous drugs tested the 8-amino-quinolin compounds and two antibiotics (chlortetracycline and oxytetracycline) were of therapeutic value in East Coast fever and Corridor disease. The high price of the antibiotics precludes their use in practice. The recognition of these specific drugs may serve as a basis for the synthesis of more potent drugs urgently required in the theileriosis and gonderiosis enzootic areas.

COOK, M. K. & JACOBS, L. (1958). **Cultivation of *Toxoplasma gondii* in tissue cultures of**

various derivations.—*J. Parasit.* **44**, 172-182. [Authors' summary modified.] **3936**

A wide range of mammalian and avian cells will support the growth of *T. gondii*. Evidence suggests the presence of non-susceptible cells in cultures of monkey kidney tissue.

A relation between temperature and the multiplication of toxoplasms has been shown in tissue cultures.

Colchicine-arrested cultures of monkey cells apparently are as able to support the growth of toxoplasms as non-treated cells.

No variation in the lysis times of cells in tissue cultures due to the proliferation of toxoplasms was noted between cells of various age groups.

The virulence of a strain of toxoplasm appeared to be maintained after prolonged serial passage in tissue cultures. There was no evidence of toxin production.

COOK, M. K. & JACOBS, L. (1958). *In vitro* **investigations on the action of pyrimethamine against** *Toxoplasma gondii*.—*J. Parasit.* **44**, 280-288. **3937**

An exposure of 4 days to a concentration of 0·25 μg./ml. of pyrimethamine was sufficient not only to prevent lysis of the monkey kidney cells but to free the cultures from the parasite. Pyrimethamine had no effect on non-proliferating toxoplasma or on its ability to enter tissue culture cells.

Treatment could be delayed for 48 hours after infection of tissue cultures and still be effective. The age of the host cell had no effect on the ability of the drug to kill the parasites. The synergic effect of pyrimethamine and sulphadiazine against *T. gondii* was confirmed *in vitro*.—R.M.

LUDVIK, J. (1958). Elektronenoptische Befunde zur Morphologie der Sarcosporidien. (Sarcocystis tenella Railliet 1886.) **[Morphology of sarcosporidia as revealed by electron microscopy.]**—*Zbl. Bakt. I.* (*Orig.*) **172**, 330-350. [Summaries in English, French, Spanish and Russian.] **3938**

A detailed cytological study with 7 plates of electron photomicrographs and a coloured plate showing histochemical reactions.—R.M.

See also absts. **3990** (counting helminth eggs and protozoan cysts in faeces); **4097** (potential trypanocides); **4127** (animal diseases transmissible to man).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

ALOSI, C. (1958). Ricerche elettroforetiche con sieri di bovini inoculati con infravirus dell'afta epizootica (tipo "A") per la produzione di infravirus. **[Serum electrophoresis in cattle infected with foot and mouth disease virus.]** —*Zooprofilassi* **13**, 255-261. **3939**

An electrophoretic study of the serum proteins of cattle 20 hours after artificial infection with F. & M. disease virus, Type A, showed no appreciable changes.—T.E.G.R.

PLATT, H. (1958). **Observations on the pathology of experimental foot-and-mouth disease in the adult guinea-pig.**—*J. Path. Bact.* **76**, 119-131. [Author's summary modified.] **3940**

In g.pigs experimentally infected with the virus of F. & M. disease, epithelial lesions were seen in the oesophagus, prepuce, and ear, the perineal region of males and pregnant females, and the teats of pregnant and lactating females, as well as on the tongue, lips and feet.

Necrosis of the exocrine tissue of the pancreas developed in the majority of g.pigs.

Occasional cardiac muscle fibres underwent necrosis and calcification, but severe myocardial damage was not seen. Striated somatic muscle showed only very slight involvement.

HOLBROOK, A. A. & GELETA, J. N. (1958). **Vesicular stomatitis immunization with inactivated vaccines of chicken embryo origin.**—*Proc. 61st. Ann. Meet. U.S. live Stk sanit. Ass.*, St. Louis, 1957 pp. 308-315. [Authors' summary modified.] **3941**

Crystal violet vaccines of chick embryo origin inactivated by incubation at 37°C. or by the addition of beta-propiolactone were tested in pigs. The beta-propiolactone-inactivated vaccine was the more efficient and gave complete protection for one month against challenge with vesicular stomatitis virus when doses of 1, 2·5, 5, and 10 ml. were used, and gave partial protection for 3 months when doses of 10 ml. were used. The vaccine inactivated with heat produced less immunity, but a second vaccination prolonged the immunity.

KISSLING, R. E. (1958). **Growth of rabies virus in non-nervous tissue culture.**—*Proc. Soc. exp. Biol., N.Y.* **98**, 223-225. [Author's summary modified.] **3942**

Both fixed and street rabies virus strains were propagated serially in hamster kidney tissue cultures but no cytopathogenic changes were evident in these cultures.

PITZSCHKE, H. (1958). Erfahrungen mit dem Sellers-Quetschpräparat und dem Mäuse-Tierversuch bei der Laboratoriums-Diagnose der Tollwut. **[Experiences with impression smears and mouse inoculation for diagnosis of rabies.]**—*Zbl. Bakt. I.* (*Orig.*) **172,** 197-211. [Summaries in English, French, Spanish and Russian.] **3943**

From the results of 9,820 rabies investigations (1,794 positive) made at the Thüringen veterinary investigation centre, P. confirmed the diagnostic value of impression smears stained by the method of Sellers (1927), and mouse inoculation tests. Salivary gland tissue was particularly suitable for inoculating into mice. Urine of infected foxes was infective for mice.
—R.M.

GOLDWASSER, R. A. & KISSLING, R. E. (1958). **Fluorescent antibody staining of street and fixed rabies virus antigens.**—*Proc. Soc. exp. Biol., N.Y.* **98,** 219-223. [Authors' summary modified.] **3944**

Methods of fixing and staining rabies-infected mouse brain smears with fluorescent antibody are described. The possible usefulness of this method for diagnosis of rabies in Negri-negative animals and for serological determinations following immunization against rabies is indicated. It may be useful in the detection of virus in salivary glands.

SCATOZZA, F. & CASTRUCCI, G. (1958). Ricerche sperimentali sugli anticorpi neutralizzanti il virus fisso della rabbia. **[Neutralizing antibodies against fixed rabies virus.]**—*Vet. ital.* **9,** 374-381. [Summaries in English, French and German.] **3945**

Immunity in mice, following vaccination, was confirmed by neutralization tests *in vitro* and *in vivo;* antibodies were present in the serum but not in the c.n.s. These antibodies, although in high concentration, did not confer absolute protection against infection by the cerebral route.—T.E.G.R.

CILLI, V. & BALDELLI, B. (1958). Aspetti morfologici di cellule testicolari di *Ovis aries* coltivate *in vitro* e infettate con virus del vaiolo ovino. **[Effect of sheep pox virus on ovine testicular cells cultured *in vitro*.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 845-849. [Summaries in English and French.] **3946**

The cytopathogenic effects of the virus on ovine testicular cells cultured *in vitro* are characterized by cytoplasmic inclusions, nuclear vacuoles and necrosis. These changes do not appear simultaneously but at different stages of incubation. Cytoplasmic inclusions occur during multiplication of the virus before the complete infective stage is reached; vacuolation of the nuclei is associated with exponential increase of the virus; and necrosis occurs after the peak of the growth curve has been reached and the virus is gradually undergoing inactivation.
—T.E.G.R.

BAMBERGER, K. & SZAKMÁRY, G. (1958). Különböző baromfihimlő elleni oltóanyagok és oltási módszerek összehasonlító vizsgálata pulykán. **[Vaccines and vaccination methods against fowl pox in turkeys.]**—*Mag. állator. Lapja* **13,** 38-39. [In Hungarian. Summaries in English and Russian.] **3947**

Various methods of using fowl pox vaccine prepared from the allanto-chorion passage of the living virus (described by Bamberger *et al.* [*V.B.* **28,** 1046]) were compared in experiments on turkeys. The formol-inactivated virus given s/c conferred no immunity; the live virus in a dilution of 1:3,500 given i/m conferred immunity on 42·5%; the same in a dilution of 1:20 given i/m. on 51·1%; the previous two dilutions mixed with ½ volume of aluminium hydroxide given s/c, on 71·1%; and the live virus in a dilution of 1:20 given either by the wing-web method or rubbed into the feather follicles, on 100% of the turkeys, against challenge on the 46th day after vaccination. For the injections 0·5 ml., and for the wing-web method 0·03 ml. of the vaccine was used. The administration of the live virus in a dilution of 1:20 proved best provided it was given by the wing-web or the rubbing method.—A. SEBESTENY.

BYSTRICKÝ, V., ŽUFFA, A. & ŠKODA, R. (1958). Elecktrónmikroskopické znázornenie slepačieho a holubieho vírusu vtáčích kiahní. **[Electron-microscopical demonstration of fowl and pigeon pox virus.]**—*Vet. Čas.* **7,** 136-143. [In Slovak. Summaries in English, French, German and Russian.] **3948**

The viruses of fowl pox and pigeon pox were studied electronmicroscopically and there was practically no difference in size and shape, both measuring about 420 by 480 mμ.—E.G.

ERNEK, E. & ŠKODA, R. (1958). Izolácia vírusu kliešťovej encefalitídy z hrdzuaka hôrneho (*Clethrionomys glareolus*). **[Isolation of tick-borne encephalitis virus from the field mouse *Clethrionomys glareolus* in Slovakia.]**—*Vet. Čas.* **7,** 127-135. [In Slovak. Summaries in English, French, German and Russian.] **3949**

A neurotropic virus, isolated in Slovakia

from a field mouse, *Clethrionomys glareolus*, was identified by cross-neutralization and pathogenicity tests in mice, hamsters, rats, g.pigs and rabbits as that of Czechoslovak tick-borne encephalitis.—E.G.

ERNEK, E. & ŠKODA, R. (1958). Experimentálna patogenita vírusu kliešťovej encefalitídy pre zlaté chrčky *Mesocricetus auratus* (Waterhouse 1839) a pre líšky *Vulpes vulpes* (Linné 1758). **[Pathogenicity of tick-borne encephalitis virus for hamsters and foxes.]**—*Vet. Čas.* **7,** 334-341. [In Slovak. Summaries in English, French, German and Russian.] **3950**

Two groups of 20 and 30 adult hamsters each were infected intracerebrally with doses of 0·1 ml., and intraperitoneally with 0·2 ml., respectively, of a 10% brain suspension from mice with Czechoslovak tick-borne encephalitis. In the blood the virus persisted for 2–4 days, in the brain for 14–20 days. High antibody levels developed 8–15 days after infection and persisted for a minimum of 106 days. In a fox cub which had survived subcutaneous infection the virus persisted in the blood for 1–4 days, antibodies were demonstrated 10–20 days after infection. When killed the 39th day after infection, the c.n.s. of the cub was free from virus. —E.G.

SUSSMAN, O., COHEN, D., GERENDE, J. E. & KISSLING, R. E. (1958). **Equine encephalitis vaccine studies in pheasants under epizootic and pre-epizootic conditions.** — *Ann. N.Y. Acad. Sci.* **70,** 328-341. [Authors' summary modified.] **3951**

Seven days after the outbreak of this disease on 2 pheasant farms, birds in affected pens were vaccinated i/m with a formolized chick embryo vaccine. The mortality rates in the 3 pens were as follows: 29·8% (100% vaccinated), 44·4% (48·5% vaccinated), 71·1% (none vaccinated). Analysis of the results indicated that the vaccine protected the vaccinated birds and, to a degree, the unvaccinated birds as well. The use of vaccine influenced the epidemic so that the peak of mortality occurred earlier in pens of vaccinated birds than in the pen in which birds were not vaccinated. In a pen where most of the birds had been vaccinated, an outbreak occurred 23 days after vaccination; 87·5% of the vaccinated birds were protected while only 30·3% of the controls survived. The highest mortality occurred in the second week of the outbreak in vaccinated birds, and in the first week in controls. This suggests that a vaccine "break" occurred only after a sufficient virus challenge had developed.

BÁRDOŠ, V. (1958). Štúdia o protilátkach neutralizujúcich vírusy konských encefalomyelitíd západného a východného typu v sérach domácich zvierat na Slovensku. **[Antibodies neutralizing the viruses of equine encephalomyelitis, Eastern and Western type, in the serum of domestic animals in Slovakia.]** —*Vet. Čas.* **7,** 115-126. [In Slovak. Summaries in English, French, German and Russian.] **3952**

Serum from domestic animals and wild birds was examined for Eastern and Western equine encephalomyelitis antibodies in 2 districts of Slovakia, using an extra-neural virus neutralization test in unweaned rats and an intracerebral neutralization test in mice. Techniques of both tests were described. Both Eastern and Western type antibodies occurred in samples from cattle, sheep and pigs, the incidence of Eastern type being higher. In domestic poultry and cormorants antibodies against Eastern type were demonstrated. Neither Eastern nor Western type antibodies were, however, demonstrated in horses and gulls.—E.G.

WELSH, H. H., NEFF, B. J. & LENNETTE, E. H. (1958). **Isolation and identification of Western equine encephalomyelitis from mosquitoes by tissue culture methods.**—*Amer. J. trop. Med. Hyg.* **7,** 187-196. **3953**

Batches of mosquitoes were ground up with rabbit serum and buffered saline pH 7·4. The mixture was centrifuged and the supernatant fluid was inoculated on to cultures of chick embryo cells for up to 168 hours. The virus was identified by neutralization tests with the aid of a colorimetric method to indicate cell death or cell growth after addition of test sera.—R.M.

GUARINI, G. & SACCO, T. (1958). Preparazione di un nuovo antigene da globuli rossi di cavallo infetto da impiegarsi nella D.D.C.M. per diagnosi di anemia infettiva. **[Preparation of antigen, for the complement-fixation test for equine infectious anaemia, from the red blood corpuscles of infected horses.]** — *Vet. ital.* **9,** 196-200. [Summaries in English, French and German.] **3954**

The antigen is prepared from r.b.c. of infected horses by extraction with alcohol. This is easier and more economical than the preparation of antigen from the spleen and gives equally satisfactory results.—T.E.G.R.

GERBER, W. (1958). Die Nachweistechnik und das Erscheinen der Sideromonozyten im Blut der vena jugularis bei den verschiedenen Stadien der infektiösen Anämie des Pferdes.

[Sideromonocytes in venous blood during various stages of equine infectious anaemia.] — *Schweiz. Arch. Tierheilk.* **100**, 23-35. [English, French and Italian summaries.] **3955**

Sideromonocytes were demonstrated in the venous blood in all of 10 clinical cases of equine infectious anaemia and in 7 of 10 horses in the latent stage of this disease. As each blood test takes up to 3 hours, the method is not recommended for routine diagnosis. The number of sideromonocytes in the blood was not increased by an hour of strenuous exercise.—M.G.G.

BRACKEN, E. C. & RANDALL, C. C. (1957). **Studies on hepatitis in hamsters infected with equine abortion virus. II. Changes in protein, nucleic acid, and weight of isolated hepatic nuclei.**—*Amer. J. Path.* **33**, 1009-1022. **3956**

The average weight of nuclei of liver cells increased between 9 and 15 hours after i/p inoculation of the virus. During the same period the conc. of ribonucleic acid also increased, but the conc. of deoxyribonucleic acid did not change. The infection provided a good model for the study of relationships between virus and cells of the host.—R.M.

BROWN, R. D. (1958). **Rinderpest immunity in calves—a review.**—*Bull. epiz. Dis. Afr.* **6**, 127-133. [Summary in French pp. 183-184. Author's summary modified.] **3957**

Calves as young as one day old can produce antibodies to rinderpest antigen as well as adults. Calves born to immune dams lack rinderpest antibodies at birth but receive them from their dam in the colostrum during the first few hours of life. This passive immunity disappears when the calves are about 11 months old. Passive immunity in calves may interfere with the production of an active immunity. The inoculation of rinderpest vaccine into calves may interfere with the production of an active immunity. The inoculation of rinderpest vaccine into calves of 3 months old or less is without effect, whereas all calves of about 8 months old or more produce antibodies.

SCOTT, G. R. & BROWN, R. D. (1958). **A neutralization test for the detection of rinderpest antibodies.**—*J. comp. Path.* **68**, 308-314. [Authors' conclusions modified.] **3958**

A neutralization test for the detection of rinderpest antibodies is described, based on the response to lapinized rinderpest virus. Antibodies were detected in the sera of cattle with active and passive immunity, acquired both naturally and artificially. Virulent and attenuated strains of virus stimulated similar levels of antibody and these were greater than those following vaccination with partially inactivated virus. Antibody titres in other animals in which the virus multiplied were similar to the titres in cattle. The relationship between the amounts of virus neutralized and the dilution of serum required was linear.

PRITCHARD, W. R., CLAFLIN, R. M., GUSTAFSON, D. P. & RISTIC, M. (1958). **Infectious bovine ulcerative stomatitis.** — *Proc. 61st. Ann. Meet. U.S. live Stk sanit. Ass.* St. Louis, 1957 pp. 158-168. [Authors' summary modified.] **3959**

The chief clinical and pathological characteristics of infectious bovine ulcerative stomatitis are described. Some of the physical and biological properties of the causative agent, a virus, are presented. The disease is compared to the ulcerative stomatitis of calves described by Gibbons (1956), virus diarrhoea, mucosal disease, vesicular stomatitis, and so-called mycotic stomatitis or muzzle disease. [See also *V.B.* **28**, 3229.]

GAMČÍK, P. (1958). Infekčná balanopostitída býkov. Zpráva o výskyte a tlmení choroby. **[Incidence and control of balanoposthitis in bulls.]** — *Vet. Čas.* **7**, 32-45. [In Slovak. Summaries in English, French, German and Russian.] **3960**

An infectious balanoposthitis of unidentified aetiology in bulls was described. Clinically the condition resembled that produced by the virus of granular vaginitis and coital vesicular exanthema. A mild and a severe form were observed. The disease was transmissable to healthy heifers and bulls by infected semen. Approximately 240 bulls were examined of which about one third was infected. Symptoms included roughening of the mucous membranes of the penis and petechial haemorrhages on penis and preputial mucosa. At a later stage petechiae became larger and transformed into flat, bleeding nodules. Libido and rate of micturition and defaecation were increased. In experimentally infected heifers there was swelling of the vulva, purulent vaginitis and increase in body temp. by about 1°C. There were small nodules, particularly in the region of the clitoris. One infected heifer was killed and P.M. there were small haemorrhages in uterus and bladder and a tough opaque mucus was present, particularly in the uterine horns. P.M. lesions in another heifer were milder and there were no haemorrhages in the bladder. Histologically vaginal and preputial smears from infected animals contained twice the nor-

mal amount of cellular elements. Treatment with Lugol's soln., acriflavine, chlortetracycline and oxytetracycline ointment was successful in all mild and about 50% of the severe cases. A virus was believed to be the primary cause, with streptococci, corynebacteria and other organisms as secondary contaminants.—E.G.

BUGYAKI, L. (1957). Une maladie à ultravirus du mouton, transmise par des tiques. [**"Kisenyi sheep disease"—A viral infection transmitted by Arthropoda.**] — *Bull. epiz. Dis. Afr.* **5,** 531-535. [In French. Summary in English p. 467.] **3961**

A general account of the disease, details of which have been published previously [*V.B.* **26,** 2293 and **28,** 2150].—R.M.

I. ROMVÁRY, J. (1958). Vírusabortus-fertőzöttség juhállományainkban. [**Virus abortion in Hungarian sheep.**]—*Mag. állator. Lapja* **13,** 81-83. [In Hungarian. Summaries in English and Russian.] **3962**

II. HAJDÚ, G., RATALICS, L., SZABÓ, J. & TEMESI, Z. (1958). A juhok virus okozta elvetélésének előfordulása hazánkban. [**Ovine virus abortion in Hungary.**]—*Ibid.* 83-86. [In Hungarian. Summaries in English and Russian.] **3963**

I & II. Blood samples of 536 sheep from 9 flocks where abortions and stillbirth frequently occurred were investigated for antibodies to the virus of enzootic abortion. Complement fixation in 1:32 dilution was regarded as positive. 6–46% of the samples were positive. The highest titres were in recently aborted ewes, whilst no positive case was observed amongst lambs and hoggs under one year of age. Inclusion bodies were not demonstrable in the uterus of a ewe which had aborted 4 months previously.

From 308 pregnant ewes of another flock 28 aborted and 54 produced premature lambs because of virus infection of undetectable origin. Virus inclusion bodies were demonstrable (using Stamp's staining method) in the foetal membranes of a ewe which aborted when 4½ months pregnant. Mice were infected by intranasal inoculation and the virus was passaged in mice, partly directly, partly through the allantois of 5-day-old chick embryos.—A. SEBESTENY.

AGEEV, I. Y. (1958). [**Study by electron microscopy of swine fever virus in blood of infected pigs.**]—*Vopros. Virusologii* **3,** 221-225. [In Russian. Summary in English.] **3964**

Blood from 44 healthy pigs and 75 pigs with swine fever was examined. Spherical bodies between 20 and 44 mμ in diam. were observed on the surface of the erythrocyte membrane in preparations of blood from infected pigs. Similar bodies were present in deposit from Seitz filtrates of serum from infected pigs. No bodies were seen in preparations from healthy pigs, or from the same pigs before infection. The method described was considered to have practical possibilities for the diagnosis of swine fever. —R.M.

MESÁROŠ, E. & VAŘEJKA, F. (1958). Pokus o léčebné použití specifického gama-globulinu a vitaminu B u prasat onemocnělých enzootickou bronchopneumonií. [**Use of gamma-globulin combined with vitamin B in swine influenza.**]—*Sborn. vys. Šk. zemědělsk. les. Brno, Ser. B* **7(28),** 115-124. [In Czech. Summaries in English, German and Russian.] **3965**

There was improvement in the general condition of 34 pigs, experimentally infected with swine influenza, given i/m doses of 0·5 ml. per 5 kg. body wt. of a preparation consisting of a 16% solution of specific gamma-globulin prepared from swine influenza serum, homogenized at 20°C. with 50 ml. of "Beviplex", a synthetic vitamin B preparation. Gamma-globulin alone was less effective and "Beviplex" alone not effective at all.—E.G.

BÖRNFORS, S. & LANNEK, N. (1958). **Studies on the immunity of swine enzootic pneumonia.** —*Nord. VetMed.* **10,** 426-430. [In English. Summaries in German and Swedish.] **3966**

Pigs which had recovered from infection with the agent of porcine enzootic pneumonia were resistant to re-infection by intranasal or intratracheal inoculation, although no antibodies could be detected in the serum [*V.B.* **27,** 2081]. When the agent was administered either by intranasal inoculation to pigs receiving tetracycline or by repeated intramuscular injections, resistance to later challenge was absent.—R.M.

VERLINDE, J. D. & VERSTEEG, J. (1958). Coxsackie-viruspneumonie bij biggen als smetstofbron voor de mens. [**Coxsackie virus pneumonia in pigs as a source of infection for human beings.**]—*Tijdschr. Diergeneesk.* **83,** 459-468. [In Dutch. Summaries in English, French and German. English summary modified.] **3967**

Pigs with virus pneumonia were suspected as a common source of infection for an outbreak of acute febrile illness in children. Group A Coxsackie virus type 5 was isolated from the pigs' lungs, and sera from the convalescent

children showed an extremely high neutralization index to this strain. In the first 2 passages in unweaned mice the virus was exclusively pneumotropic, but later a definite myotropism appeared. After the fourth mouse passage (carcass suspension) it caused virus pneumonia in intranasally infected pigs and, again pneumotropic, could be isolated from the lungs. The histological picture of the experimental disease resembled that of the natural disease. Specific neutralizing antibody developed in the experimental disease.

NICOL, L., GIRARD, O., CORVAZIER, R., CHEYROUX, M. & RECULARD, P. (1958). Essais de titrage sur oeuf embryonné du virus de Carré, et d'un anti-serum hyperimmun. **[Titration in embryonated eggs of distemper virus and a hyperimmune serum.**—*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 67-69. [In French.] **3968**

Titration in embryonated eggs gave unreliable results.—R.M.

GREENLAND, R. M. & MOULDER, J. W. (1958). **The development of resistance to a quinoxaline N-oxide in feline pneumonitis virus.**—*J. infect. Dis.* **102,** 294-299. [Authors' summary modified.] **3969**

A strain of feline pneumonitis virus resistant to 2, 3-dimethylquinoxaline-1,4-dioxide was produced by five serial passages in the chick embryo yolk sac in the presence of the drug. Fully resistant virus was unaffected by doses of the drug which increased the mean survival time of embryos infected with parent virus by more than 5 days. This rapid increase in resistance suggests a higher rate of mutation than has been observed with other agents which inhibit the growth of the psittacosis group of viruses. Resistance to the quinoxaline oxide did not change during repeated drugless passage at high virus concentration. Drug resistance increased in three definite steps, indicating relatively homogeneous resistance at each step. It was concluded that feline pneumonitis virus probably becomes resistant to the quinoxaline oxide by a mechanism similar to that responsible for resistance to penicillin in bacteria. Quinoxaline oxide resistance has many features which recommend it as a marker in genetic studies with the psittacosis group of micro-organisms.

DALMAT, H. T. (1958). **Arthropod transmission of rabbit papillomatosis.**—*J. exp. Med.* **108,** 9-20. [Author's summary modified.] **3970**

The virus of rabbit papillomatosis was transmitted by *Aedes aegypti, Rhodnius prolixus,* and *Triatoma infestans* from papillomas induced in cottontail rabbits, and, by *A. aegypti,* from papillomas induced in domestic rabbits. This was accomplished by interrupted feeding, feeding after an interval of several days from the infective meal, or by application of a suspension of the mouthparts of the insects either immediately after their infective meal or several days later. Insect transmission was also successful from the satellite growths due to subcutaneous extension of typical papillomas in infected cottontails, and from certain peculiar subcutaneous nodules arising rapidly after infection and not hitherto described. They resembled rabbit fibromas, but antibodies to fibroma virus could not be demonstrated by neutralization tests with the sera of affected animals.

QUESADA, A. & CALAPRICE, A. (1958). Indagini sull'azione svolta dalla tossina del *Cl. perfringens* di tipo C sull'inibitore non specifico (I.N.S.) della emoagglutinina del virus di Newcastle. **[Action of *Clostridium welchii* Type C toxin on non-specific haemagglutination inhibition of Newcastle disease virus.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 871-875. [Summaries in French and German.] **3971**

From results of experiments it was concluded that Newcastle disease virus is sensitive to non-specific inhibitors contained in the serum of g.pigs and rabbits and in egg albumen. The toxin of *Cl. welchii,* Type C, (though it does not contain lecithinase) and its fractions obtained by precipitation with 33% or 50% (but not 15%) ammonium sulphate are antagonistic to the non-specific inhibitors and the toxins themselves destroy the receptors of chicken r.b.c.

—T.E.G.R.

ŠKODA, R. & ŽUFFA, A. (1958). Epizootológia newcastelskej choroby na Slovensku, doterajšie výsledky prevencie a perspektívy pre likvidáciu. **[Control of Newcastle disease in Slovakia.]**—*Vet. Čas.* **7,** 46-65. [In Slovak. Summaries in English, French, German and Russian.] **3972**

Newcastle disease became epidemic during 1948–49 and since then modifications in its character have been observed, namely lower mortality, higher incidence in young birds and increased presence of respiratory and nervous symptoms. A vaccination programme with Hertfordshire strain, started in 1951, has had a certain amount of success. The value of chick

immunization, particularly with strains B1 and F, which had been successfully tested under field conditions in 56,000 chicks was discussed. —E.G.

HITCHNER, S. B. & WHITE, P. G. (1958). **A comparison of embryo and bird infectivity using five strains of laryngotracheitis virus.**—*Poult. Sci.* **37,** 684-690. [Authors' summary modified.] **3973**

In comparison of 4 methods of inoculating chick embryos for the titration of laryngotracheitis virus, the dropped membrane technique consistently gave the highest titres. The use of penicillin and dihydrostreptomycin in the broth diluent did not affect the viability of the virus. An excellent method of challenge was inoculation *via* the infraorbital sinus. In a comparison of 5 virus strains from commercial vaccines, there was little difference in the EID_{50} required to infect birds by the sinus route, but there was a more distinct difference in their infectivity by the vent route of inoculation. Virus preparations which produced 50% or more readable "takes" by vent application protected nearly 100% of birds against a sinus challenge, immunity developing as early as 3 days after vaccination.

ROOTS, E. & ROTT, R. (1958). Herstellung eines hochwertigen komplement-bindenden Antigens aus gereinigtem Psittakose-Virus. **[Preparation of an effective complement-fixing antigen using purified psittacosis virus.]** —*Zbl. Bakt. I. (Orig.)* **172,** 29-36. [Summaries in English, French, Spanish and Russian. English summary modified.] **3974**

By repeated freezing and thawing of purified and concentrated virus, prepared from the allantoic membranes of chick embryos, a transparent, colourless and highly specific antigen for the c.f. test was prepared which was free from anticomplementary action. The antigen could be sedimented nearly completely by centrifugation for 90 min. at ×100,000 gravity. Electron microscopic examinations led to the suggestion that the antigen may be derived from the interior of the elementary bodies.

KAWAKAMI, Y., KAJI, T., SUGIMURA, K., OMORI, T. & MATUMOTO, M. (1958). **Miyagawanella: psittacosis-lymphogranuloma group of viruses. 5. Isolation of a virus from faeces of naturally infected sheep.**—*Jap. J. exp. Med.* **28,** 51-58. [In English. Authors' summary modified.] **3975**

A virus of the psittacosis-lymphogranuloma group was isolated from the faeces of 8 out of 25 apparently healthy sheep in Japan. This finding and a high incidence of c.f. antibodies against the virus indicate a high incidence of the infection in sheep. The virus is closely related to the bovine strain of psittacosis-lymphogranuloma virus previously described [Matumoto & others, *Jap. J. exp. Med.* **25,** 223 (1957)] and the goat pneumonitis virus. Preliminary examination indicates that it is more closely related to the former virus than the latter. The virus was readily isolated in developing eggs after an intermediate passage in g.pigs. The formation of c.f. antibodies in inoculated g.pigs is a good criterion for the presence of the virus in suspected material.

KAPP, P. (1958). Az állati virushepatitisek és azoknak viszonya az ember hepatitis epidemica-jához. **[Virus hepatitis in animals and man.]**—*Mag. állator. Lapja* **13,** 94-97. [In Hungarian.] **3976**

The author reviewed virus hepatitis in dogs (Rubarth's disease), mice, ducklings, sheep (Rift Valley fever), and man (hepatitis epidemica). He states that the only virus hepatitis occurring in animals which has so far been found artificially and naturally transmissible to man is Rift Valley fever of sheep.—A. SEBESTENY.

KEEBLE, S. A., CHRISTOFINIS, G. J. & WOOD, W. (1958). **Natural virus-B infection in rhesus monkeys.** — *J. Path. Bact.* **76,** 189-199. [Authors' summary modified.] **3977**

The authors described a hitherto unrecognized clinical syndrome occurring naturally in rhesus monkeys and associated with infection by the virus B, isolated by Sabin & Wright (1934).

Vesicular lesions of the tongue and lips are the main feature. Involvement of the central nervous system occurs in a high proportion of the cases and lesions are found in the roots of the facial and trigeminal nerves, in the descending tract of the trigeminal nerve and in the solitary tract of the medulla. Histologically, type-A inclusion bodies were observed in both dermal and nervous system lesions.

The disease was first noticed in 1956 in a group of 18 rhesus monkeys, 6 of which had either lip or tongue ulcers. In the subsequent months, 1,400 monkeys received in the lab. were examined shortly after arrival and the disease was present in 32.

MALHERBE, H. & HARWIN, R. (1958). **Neurotropic virus in African monkeys.**—*Lancet* September 6th, 530. **3978**

A virus resembling the B virus of Sabin and Wright (1934) was twice isolated in Johan-

nesburg from the central nervous system of African vervet monkeys (*Cercopithecus aethiops pygerythrus*).—R.M.

ACKERMANN, W. W., PAYNE, F. E. & KURTZ, H. (1958). **Concerning the cytopathogenic effect of poliovirus; evidence for an extraviral toxin.**—*J. Immunol.* **81**, 1-6. **3979**

Slowly evidence has been accumulating which supports the hypothesis that viral multiplication and cell injury are dissociable phenomena. Host–virus interactions from which viral multiplication does not result may exhibit, on the part of the cell, typical viral pathogenic effects. It has been suggested that cell injury might be selectively inhibited although the normal rate of viral increase is maintained. Recent reports of a differential temperature dependence of these two reactions lends support to the concept. The present study offers a possible explanation for this observed degree of autonomy of the cytopathogenic effect of a viral infection. Evidence is presented for the production in virus-infected cells of a toxic activity which may account in part for the cytopathology associated with infection by poliovirus.—R.M.

HENNEBERG, G. & DRESCHER, J. (1958). Beschreibung einer photometrischen Methode zur Virus- und Antikörpergehaltsbestimmung mittels der Erythrozytenaggregation. I. Mitteilung. [**A photometric method for the determination of virus and antibody concentrations by erythrocyte aggregation. I.**]—*Zbl. Bakt. I.* (*Orig.*) **172**, 37-43. [Summaries in English, French, Spanish and Russian. English summary modified.] **3980**

Appropriate methods for the assay of virus and antibody concentrations are lacking for many viruses. The phenomenon of erythrocyte aggregation, described in this paper, and its quantitative variations by viruses and specific antibodies, suggest a possible method for exact determination of concentrations of viruses. The influence of virus and antibody conc. on the aggregation of erythrocytes with reduced electric surface potential was virus-specific.

KARULIN, B. E. & PCHELKINA, A. A. (1958). [**Warm-blooded animal carriers of** *Rickettsia burneti*.] — *C. R. Acad. Sci. U.R.S.S.* **119**, 1054-1056. [In Russian.] **3981**

Complement-fixation tests were performed on sera from 1,026 wild mammals and birds belonging to 38 species captured in Kazakhstan, or on sera from g.pigs inoculated with tissues from the animals. Positive results were obtained only with *Sciurus vulgaris, Marmota bobac, Citellus pygmaeus, Sicista subtilis, Allactaga jaculus, Clethrionomys rutilis, Microtus oeconomus, Ochotona pusilla, Pastor roseus, Riparia riparia*.—R.M.

See also absts. **4062** (simultaneous ornithosis and salmonellosis in ducks and geese); **4127** (animal diseases transmissible to man).

IMMUNITY

BÖSZÖRMÉNYI, J. (1958). **A simple method for absorbing heterologous antibodies from precipitating sera.**—*Nature, Lond.* **181**, 1344-1345. **3982**

A method is described for obtaining monovalent precipitating antisera from rabbits injected with soluble antigens. The heterologous antigens are rendered insoluble by adsorbing them on to aluminium hydroxide gel, and used to absorb out the heterologous antibodies. The titre of the homologous antibody was said to remain unchanged.—W. E. PARISH.

CINADER, B., PEARCE, J. H. & CARTER, B. G. (1958). **Acquired immunological tolerance to bovine ribonuclease.** — *Nature, Lond.* **181**, 1208-1209. **3983**

It is argued that the acquisition of immune tolerance may be facilitated where partial cross-reaction of some of the components of the antigen injected and the hosts' own tissues exists. Thus acquisition of tolerance to heterologous serum albumin may be facilitated by natural tolerance to the autologous serum albumin.

The experimental acquired immune tolerance to bovine ribonuclease in rabbits was attempted because ribonuclease would be present in lower concentrations in the body than components of serum; the crystalline product is immunologically homogeneous and it may act on the nucleic acids of antibody-forming cells.

By appropriate injections and testing the resultant sera by the tanned cell test, none of 13 young "wild" rabbits developed antibodies to bovine ribonuclease, whereas antibodies were present in 12 of 13 control rabbits. In a repeat experiment using Himalayan rabbits and Freund's adjuvant with the antigen, all of 11 controls developed antibodies, but only 2 of 6 test rabbits. It was found that the antibody response to an unrelated antigen in the test and control groups was similar. The significance of these results is discussed.—W. E. PARISH.

ASHTON, G. C. (1958). **Polymorphism in the β-globulins of sheep.**—*Nature, Lond.* **181**, 849-850. **3984**

A description of polymorphism of the beta-globulins in sheep, where 8 phenotypes were found in 118 samples of sera tested by starch gel electrophoresis. A form of nomenclature of the phenotypes is suggested. There is no evidence, as yet, that the phenotypes are genetically controlled.—W. E. PARISH.

WOJCIECHOWSKA, S. (1957). **Abortions in mares due to serological incompatibility of blood group. Preliminary report.**—*Biul. Inst. Wet. Pulawy* **1**, 94-95. [In English.] **3985**

No infectious agent was detected in 60% of abortions in mares. In 73 such cases, erythrocyte antigens and iso-antibodies in blood from each mare and stallion were studied. A high titre of iso-antibodies against stallion erythrocytes was found in only two sera. Another study of 176 horses revealed that 20·4% had iso-agglutinins, most of which were against the AF blood group of Eyquem & Podliachouk. No iso-agglutinins were present in blood from 50 horses of the AFC blood group.—R.M.

HAYASHI, J. A., STONE, W. H., LINK, K. P. & IRWIN, M. R. (1958). **The J substance of cattle. V. Immunochemical studies of the J substance from bovine gastric mucosa.** — *J. Immunol.* **81**, 82-89. [Authors' summary modified.] **3986**

Blood group specific substances have been prepared from bovine gastric mucosa. In general, preparations from cows carrying the gene for the J character show high and specific J activity as determined by inhibition tests, while those preparations from cows lacking the gene have no activity.

There was no detectable difference in the gross chemical composition of the J-active and J-inactive preparations.

The J substance prepared from gastric mucosa and the J substance as it occurs normally on r.b.c. and in the serum behaved similarly in cross-reactions within other blood group systems.

It has not been possible to produce specific precipitating antisera against the J preparations by immunizing rabbits, cattle or fowls. However, cattle immunized with a J-active preparation may have produced precipitins specifically reactive with A-active substance from porcine, equine and human sources.

SAISON, R. (1958). **Report of a blood group system in swine.**—*J. Immunol.* **80**, 463-467. [Author's summary.] **3987**

A blood group system in swine is described involving 4 factors, Ea, Eb, Ec and Ed. Four combinations of these 4 factors have been observed. The genetics of the system are consistent with the existence of 4 alleles. When the gene for factor Ea is present on a chromosome as 1 member of the allelic pair, the other 3 genetic factors are missing. The corresponding allele is identified, therefore, as Ea---, the dashes representing the absence of the genetic factors of the other 3 known antigens of the system. A chromosome not possessing the genetic factor for antigen Ea appears always to carry the genetic factor for Ed and at least 1 of the 2 remaining genetic factors and may carry all 3: *e.g.*–EbEcEd, –Eb–Ed, or – –EcEd, the dash again representing a missing genetic factor. An animal may possess a combination of any 2 of these 4 groups of genetic factors. That these groups of factors behave as alleles is demonstrated by the fact that when a chromosome possesses any of the groups described above, these factors appear to be inherited as a block or complex similar to those in some blood group systems of cattle.

The system exhibits no dominance; each character present can be detected in the corresponding phenotype, whether in the homozygous or heterozygous state.

The inheritance of this blood group system is illustrated by the results of tests of the red cells of the sires and dams of 8 matings and their offspring with antisera specific for the 4 factors. In each litter the phenotypes of the young agree with the mode of inheritance described.

SVET-MOLDAVSKAYA, I. A. & SVET-MOLDAVSKY, G. J. (1958). **Acquired resistance to experimental allergic encephalomyelitis.**—*Nature, Lond.* **181**, 1536-1537. **3988**

It was found that the brains of rabbit embryos and rabbits 24 hours old have no encephalitogenic factor for g.pigs, whereas the brains of rabbits 48 hours old have low but definite encephalitogenic activity. Repeated injection of day-old rabbit brain plus adjuvants, or rabbit embryo brain plus adjuvant into g.pigs caused no allergic encephalomyelitis. But subsequent challenge with brain and spinal cord of adult rabbits plus adjuvant resulted in 19% of the former group and 14% of the latter group developing allergic encephalomyelitis, in contrast to 75% cases in a control group which had not been previously inoculated. Moreover, repeated challenge of 17 animals which had recovered from the experimental condition demonstrated that all were resistant to further stimulation. Acquired resistance does not immediately follow administration of the brain emulsion.

It is suggested that experimental allergic encephalomyelitis is not caused by anticerebral antibodies, and that two different factors are involved: one producing acquired resistance against encephalomyelitis which is found in rabbit brains at all stages of development tested; the other factor, which induces encephalomyelitis, is found in the adult brain.—W. E. PARISH.

FRANCIS, G. E. & HAWKINS, J. D. (1958). **The use of radioactive isotopes in immunological investigations. 13. The role of leucocytes and non-plasma antibody in the removal of antigenic proteins from the blood stream of immunized rabbits.** — *Biochem. J.* **69,** 287-297. [Authors' summary modified.] **3989**

Actively, but not passively, immunized rabbits can eliminate rapidly from their blood more antigen than their sera can precipitate *in vitro,* except when they have been in the immune state for a long time.

When immune rabbits are given an injection of antigen sufficient to react with all the antibody in their plasma, a second small injection of antigen is eliminated from the blood more rapidly than in normal rabbits. There is evidence that part of the second injected dose is deposited in the liver, lungs and spleen of the immune rabbits.

These observations are discussed and it is concluded that some non-plasma antibody is partly responsible for the immune responses observed when an antigen is injected into specifically immunized rabbits.

This non-plasma antibody is unlikely to be mainly in the lymphocytes or lymphoid tissue.

Injection of antigen into immune, but not into normal, rabbits causes a profound leucopenia, which is due to a fall in the numbers of both lymphocytes and granulocytes. This phenomenon is not modified by previous injection of cortisone in amounts sufficient to cause a lymphocytopenia.

See also abstr. **3821** (anthrax); **3827-3829** & **3831** (TB.); **3836** (mycobacteria); **3840** & **3844** (listeriosis); **3849** (pasteurellosis); **3861-3865, 3868, 3871** & **3878** (brucellosis); **3887** (antigenic formula of Clostridium); **3888-3889** (phenomena studied in tissue culture); **3895** (immunotherapy of bacterial infections); **3900** (histoplasmin-latex agglutination test); **3904** (bovine contagious pleuropneumonia); **3911** (trypanosomiasis); **3939** (F. & M. disease); **3941** (vesicular stomatitis); **3942-3945** (rabies); **3947** (turkey pox); **3954** (equine infectious anaemia); **3957-3958** (rinderpest); **3966** (porcine enzootic pneumonia); **3968** (distemper); **3971-3972** (Newcastle disease); **3974** (psittacosis); **4024** & **4033** (helminths).

PARASITES IN RELATION TO DISEASE [GENERAL]

PARFITT, J. W. (1958). **A technique for the enumeration of helminth eggs and protozoan cysts in faeces from farm animals in Britain.** — *Lab. Pract.* **7,** 353-355. [Author's summary modified.] **3990**

The technique uses 3 g. of faeces and consists of a series of flotations using saturated aqueous solutions of NaCl and zinc sulphate. The method has four stages which permit a complete examination for the common helminth eggs and protozoan cysts.

ZAVADIL, R. (1958). Nejrozšířenější endoparasité u holubů a účinek piperazin-citrátu na škrkavku holubí. [*Eimeria* **and** *Capillaria* **species in pigeons and the effect of piperazine citrate on** *Ascaridia columbae.*]—*Sborn. vys. Šk. zemědělsk. les. Brno, Ser. B.* **6(27),** 87-106. [In Czech. Summaries in German and Russian.] **3991**

At an international pigeon show in Czechoslovakia *Eimeria columbarum* and *E. labbeana* were demonstrated in 180 of 205 faecal samples from locally bred pigeons. Capillaria eggs were present in 124, and *Ascaridia columbae* eggs in 48 of the samples. All 14 samples from West German pigeons contained oocysts; six also contained *A. columbae* eggs. Of 125 samples from East German birds 108 contained oocysts and 33 *A. columbae* eggs. Of 20 faecal samples from Austrian exhibits, 15 contained oocysts and 11 *A. columbae* eggs.

The effect of piperazine citrate was tested in 20 pigeons heavily infested with ascarids. The most suitable administration was in the form of a 1% solution as drinking water. Food and water were withheld for 24 hours before treatment. Within 24 hours after treatment, 16 of the pigeons were free from ascarids, two after 3 and 5 weeks respectively and 2 continued to excrete ova. A total of 960 ascarids was collected from the 20 birds.

In therapeutic doses piperazine citrate was non-toxic. Although high doses produced certain toxic symptoms they were not lethal, irrespective of the age of the birds treated.—E.G.

REID, W. M. (1958). **Incidence of helminth and external parasites in Georgia broilers.**—*Poult. Sci.* **37,** 586-592. [Author's summary modified.] **3992**

In 1,000 broilers from 100 flocks the incidence of parasitism was as follows: Nematoda, *Ascaridia galli* 27·5% in birds and 59% in flocks, *Heterakis gallinae* 6·8 and 24%; Cestoda, *Raillietina cesticillus* 0·2% and 1%, *R. echinobothrida* 0·1 and 1%, *R. tetragona* 0·1 and 1%, and *Hymenolepis carioca* 0·1 and 1%; Mallo-

phaga, *Menacanthus cornutus* 1 and 1%. Methods of management of broilers favour the completion of the life cycle of *A. galli* but have decreased and in some cases eliminated the development of other species of parasites commonly found in other poultry in the same area.

BÖHM, L. K. & SUPPERER, R. (1958). Beiträge zur Kenntnis tierischer Parasiten III. **[Studies on animal parasites. III.]** — *Zbl. Bakt. I. (Orig.)* **172,** 298-309. [For Part II, see *V.B.* **27,** 3615.] **3993**

A rather vague illness in a dog was associated with the presence in faeces of large numbers of bodies resembling yeast of the genus *Blastocystis*. Oral administration of oxytetracycline caused the bodies to disappear from the faeces and symptoms disappeared. Severe coccidiosis in a calf was caused by *Eimeria smithi*. Morphological differences between *Prosthogonimus pellucidus* and *P. longus* from fowls were discussed. Mange in a chamois was found to be caused by *Trombicula desaleri*.—R.M.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

JOHNSON, W. T. (1958). **Tests with malathion for hog lice control.**—*J. econ. Ent.* **51,** 255-256. **3994**

0·25% malathion (at approx. 475 ml. per pig) controlled *Haematopinus suis* and gave protection for at least 9 days; 1% malathion gave control for at least 30 days. Tissue from pigs sprayed twice at weekly intervals with 1% malathion and analysed 3 days after the last application contained not more than 0·08 p.p.m. of the insecticide.—W. N. BEESLEY.

SHANAHAN, G. J. (1958). **Resistance to dieldrin and aldrin in *Lucilia cuprina* Wiet.**—*J. Aust. Inst. agric. Sci.* **24,** 157-158. **3995**

Toxicity tests were carried out on flies from a farm where dieldrin was failing to control fly strike after it had been in use for three years.

With females of the field strain a dose rate of 0·25 μg. caused a negligible mortality. Female flies of a susceptible strain showed an LD_{50} for the topical application of 0·025 μg. of dieldrin.

Prepupae of a susceptible strain were all killed by immersion in 0·05% dieldrin emulsion. Prepupae of the field strain were able to tolerate immersion in 2% emulsion.

Young larvae of a susceptible strain could not survive on sheep treated a week previously with 0·025% dieldrin emulsion. Young larvae of the field strain established strikes on sheep treated with 2% dieldrin.

The field strain also showed resistance to aldrin of the order of 50 times normal.

The resistance to dieldrin and aldrin was heterogenous within the strain.

There was no pronounced tolerance to DDT, BHC or diazinon. [See also *V.B.* **28,** 2523.]—N. P. H. GRAHAM.

HATCH, C. (1958). **The control of warble fly (Hypoderma spp.) in cattle in Ireland by oral administration of "Trolene" (Dow ET-57).** —*Irish vet. J.* **12,** 150-156. [Author's summary modified.] **3996**

Two trials to test the efficacy of Dow ET-57, against *Hypoderma* larvae in cattle in Ireland are described. A single oral dose caused a reduction of 97·4% in the number of larvae which arrived beneath the skin of the back, when administered in mid-September, and of 92·8% when administered in early November. No toxic effects were observed in any of the treated animals.

GRAHAM, O. H. (1958). **Tests with Bayer 21/199 for the control of cattle grubs.**—*J. econ. Ent.* **51,** 359-360. [Author's summary modified.] **3997**

Cattle that had been exposed to infestation by *Hypoderma lineatum* and *H. bovis* were sprayed with Bayer 21/199 in three concentrations—0·25%, 0·5%, and 0·75%. In 46 of 48 treated cattle no larvae developed under the skin, whereas the untreated animals averaged 44 larvae each. Oral doses of 25 mg./kg. were less effective than sprays, but resulted in partial control.

BRUCE, W. N. & DECKER, G. C. (1958). **The relationship of stable fly abundance to milk production in dairy cattle.**—*J. econ. Ent.* **51,** 269-274. [Authors' summary modified.] **3998**

Studies conducted over 3 years established a relationship between the abundance of *Stomoxys calcitrans* and reduction in milk yield and butter-fat content during the summer months. Depressed production continued for weeks or months beyond the end of the fly season. Thus good stable fly control for 4 months may produce significant benefits for 6 months or longer.

TIEN-HSI CHENG. (1958). **The effect of biting fly control on weight gain in beef cattle.**—*J. econ. Ent.* **51,** 275-278. [Author's summary modified.] **3999**

During summer insecticide-repellent formulations were applied daily to a herd by

means of a photo-electrically controlled sprayer at the rate of approx. 75 ml. an animal. A spray containing N, N-diethyl-m-toluamide and methoxychlor in water provided effective protection against biting flies, which included *Siphona* (*Lyperosia*) *irritans* and *Stomoxys calcitrans*. Equally satisfactory results were achieved with oily sprays containing 2, 3, 4, 5-bis (delta$_2$ butylene)–tetrahydrofurfural, pyrethrins, N-octyl bicycloheptane dicarboximide and piperonyl butoxide. Both formulations were much more effective against the horn fly than against the stable fly. After 8 weeks of treatment, none of the cattle was adversely affected.

As a result of treatment, the mean daily gain in weight of the treated group was found to surpass that of the untreated group by between 230 and 300 g. a head. The cost of spray material averaged one cent a head daily.

HARLEY, J. M. B. (1958). **The availability of *Glossina morsitans* Westw. in Ankole, Uganda.**—*Bull. ent. Res.* **49**, 225-228. [Author's summary modified.] **4000**

Two areas in Ankole were studied to estimate the standard availability of *G. morsitans*. These estimates gave maximum and minimum fiducial limits of 2 and 0·19%. These are considerably lower than the estimates, obtained by Jackson in Tanganyika, of approx. 10%. This difference is of practical importance in that a single fly caught in Ankole indicates a much larger population, and this is the probable explanation of the trypanosomiasis problem round the edges of the fly-belt, where routine catches showed flies to be scarce.

SIMPSON, H. R. (1958). **The effect of sterilised males on a natural tsetse fly population.** — *Biometrics* **14**, 159-173. **4001**

The use of artificially sterilized males has been suggested as a means of controlling tsetse populations. A mathematical model of a natural tsetse fly population is set up, and the theoretical effect of the introduction of sterilized males is examined. Numerical results obtained on an electronic computer are presented and discussed.

It is concluded from the results that it is impractical to attempt the control of a high density tsetse population (about 1000 males per sq. mile) by the irradiation method, since large numbers of sterilized males are required.

Where, however, the tsetse population is of low density (about 100 males per sq. mile) the irradiation method may prove effective, especially when the low density is produced by application of an insecticide immediately before the release of sterilized males.—R.M.

WILLIAMS, M. C., WEITZ, B. & MCCLELLAND, G. A. H. (1958). **Natural hosts of some species of *Taeniorhynchus* Lynch Arribálzaga (Diptera, Culicidae) collected in Uganda, as determined by the precipitin test.**—*Ann. trop. Med. Parasit.* **52**, 186-190. [Authors' summary modified.] **4002**

Precipitin tests were carried out on samples of the blood ingested by 902 mosquitoes, *Taeniorhynchus* (*Coquillettidia*) spp., collected in two lake-shore forests of Uganda. The feeding patterns of *T. aurites*, *T. pseudoconopas*, *T. fraseri*, *T. maculipennis* and *T. metallicus* were similar, 94% of the samples being of avian blood. *T. fuscopennatus* showed a different pattern, but the sample was small and perhaps unrepresentative. 95% of the samples were identified.

ZUMPT, F. (1958). **A preliminary survey of the distribution and host-specificity of ticks (Ixodoidea) in the Bechuanaland Protectorate.** — *Bull. ent. Res.* **49**, 201-223. [Author's summary modified.] **4003**

Cattle in the eastern area and in Ngamiland were found to be infested by ten species, of which *Amblyomma hebraeum*, *Hyalomma rufipes*, *H. truncatum*, *Rhipicephalus appendiculatus*, *R. evertsi*, *R. simus* and *Boophilus decoloratus* were the most important, both in repect of the numbers infesting cattle, and of their significance as transmitters of redwater, anaplasmosis, heartwater and sweating sickness.

Sheep, goats, pigs and horses were found to be infested by nine of the species listed above as occurring on cattle.

Dogs were mainly parasitized by *Rhipicephalus simus* which outnumbered by far the two recognized dog-ticks, *R. sanguineus* and *Haemaphysalis leachii*.

Wild bovids and zebra were infested by species which also live on domestic ruminants, but the percentage of the different species present varied according to the host and to the locality.

Small birds were hosts of immature stages of *Amblyomma* and *Hyalomma* species. Their importance as carriers for the dispersal of cattle-infesting ticks was noted.

ROULSTON, W. J., NORRIS, K. R., SCHNITZERLING, H. R. & MEYERS, R. A. J. (1958). **Comparison of two formulations of DDT as dipping fluids for the control of the cattle tick.**

—*Aust. J. agric. Res.* **9,** 587-598. [Authors' summary modified.] **4004**

Fertile cattle ticks matured on cattle dipped at fortnightly intervals in 0·5% *pp*'-DDT as a wettable powder preparation; but none matured on cattle dipped at fortnightly intervals in 0·5% *pp*'-DDT as a "colloidal" preparation, although numerous larval ticks attached to the cattle between dippings. This difference was due largely to differences in the amounts of DDT left on the hair of the cattle by the two formulations. Hair samples from cows immediately after dippings in the wettable powder carried more or less uniform amounts of DDT throughout the series of dippings. The quantities of DDT deposited on the hair by the freshly prepared "colloidal" fluid were of the same order as those from the wettable powder; but there were greatly increased deposits at subsequent dippings, particularly those carried out a fortnight after fresh concentrate had been added to the vat.

Cattle dipped in both formulations removed more DDT from the vat than could be accounted for by the volume of fluid contained in the hair. This "stripping" effect was most marked in the older "colloidal" preparations.

The amounts of DDT remaining on the hair a fortnight after dipping were of the same order in both preparations, and showed a progressive increase with the increasing age of the dipping fluid.

AESCHLIMANN, A. (1958). Développement embryonnaire d'*Ornithodorus moubata* (Murray) et transmission transovarienne de *Borrelia duttoni*. **[Embryonic development of *O. moubata* and transovarian passage of *B. duttoni*.]** — *Acta trop., Basel* **15,** 15-64. [In French. Summaries in English and German.] **4005**

In the first part of the paper the 9-day embryogenesis of *Ornithodoros* is described in detail. Nucleus and chromosomes dissolve during oogenesis and re-form soon after oviposition; the vitellophages take part in the formation of the digestive system, as in other Acarina. The embryonic fourth pair of legs withdraw below the body surface on the eighth day of egg development, reappearing after the first moult as fully formed appendages.

The second section deals with the transmission of *Borrelia duttoni* through the ovary [see also *V.B.* **23,** 2484, for transovarial passage of *L. icterohaemorrhagiae* in *O. moubata*]. Spirochaetes move from the haemolymph of the tick into the ovarian germ tissue, forming clusters ("nests") from which they penetrate the oocytes, although infection cannot occur once the oocyte membrane has formed. Spirochaetes remain in the yolk until the c.n.s. is formed; they are then attached to the nervous system and it is only from here that they invade the salivary glands, after the larva has hatched.

Frequently 90% of the offspring from an infected female tick carry *Borrelia,* and 60% of these are capable, as adults, of transmitting the infection through the ovary to the next generation. *Borrelia* was passaged through four generations of ticks in three years; a strain avirulent for white mice was produced.—W. N. BEESLEY.

SWEATMAN, G. K. (1958). **On the population reduction of chorioptic mange mites on cattle in summer.** — *Canad. J. Zool.* **36,** 391-397. **4006**

Reduction of the number of chorioptic mange mites on pastured cattle in summer is chiefly influenced by a number of extrinsic factors, although environmental "change" by itself and intraspecific factors may also be important.

It was possible to exclude moulting, desquamation, self-grooming and physiological skin changes as being factors deleterious to a population of *C. bovis*.—R. V. L. WALKER.

MELVILLE, C. (1958). **An apparent beneficial effect of gamma-radiation on the flour mite.** —*Nature, Lond.* **181,** 1403-1404. **4007**

Cultures of *Tyroglyphus farinae* in wheat-flour were exposed to gamma-radiation from a cobalt-60 source (single irradiation of 5×10^3 or 10^4 rad). These and untreated mite cultures were incubated at 22·5°C and 85% R.H. for 42 days, when all cultures were found to be equally viable, the sublethal irradiation increasing the numbers of fertile eggs laid. Irradiation at 2×10^4 sterilized the population.

—W. N. BEESLEY.

ROULSTON, W. J. & SCHUNTNER, C. A. (1958). **Depletion of gamma isomer from benzene hexachloride cattle-dipping fluids.**—*Aust. J. agric.* **9,** 403-420. **4008**

Depletion of gamma isomer from BHC cattle dips was observed in the field and in wash samples stored in the laboratory. There was some depletion of all isomers but that of the gamma isomer was more rapid. Under field conditions the depletion of gamma isomer proceeded fairly slowly. There was evidence that in the formulations used gamma isomer settled more rapidly from freshly prepared washes both in the field and laboratory.

In the laboratory it was found that the presence of cattle dung favoured depletion of gamma isomer—the more dung present, the

more rapid the depletion. Increased temperature also favoured depletion. Urine caused depletion. Urine caused depletion only at the higher temperatures. Inoculation with bacteria failed to increase, and autoclaving failed to prevent, depletion, so that bacteria are not a cause. The rate of depletion could be controlled by a number of chemicals. The most effective chemicals lowered the pH of the wash. Using buffering solutions it was found that little depletion occurred below pH 5. In dipping vats a high pH was associated with the sludge which settled between dippings rather than with the supernatant wash. As soils form part of the sludge some soil suspensions were tested. Soils from the entrance race to a dip which contained a high proportion of dung caused depletion. Soils from a paddock did not.

It was concluded that depletion is the result of the gamma isomer being broken down, with the release of chloride, by animal waste products in the sludge which forms between dippings, and that it is promoted by high localized pH values produced. This suggests that control of the pH of the wash will control depletion of the gamma isomer.—N. P. H. GRAHAM.

KIIGEMAGI, U., SPROWLS, R. G. & TERRIERE, L. C. (1958). **Endrin content of milk and body tissues of dairy cows receiving endrin daily in their diet.**—*J. agric. food Chem.* **6,** 518-521. [Authors' summary modified.] **4009**

Fourteen dairy cows were given daily doses of endrin ranging from 0·1 to 2 p.p.m. in the ration for 12 weeks. Small amounts of endrin were excreted in the milk at all levels of intake. Concentrations of up to 1 p.p.m. were found in the body fat.

TERRIERE, L. C., KIIGEMAGI, U. & ENGLAND, D. C. (1958). **Endrin content of body tissues of steers, lambs, and hogs receiving endrin in their daily diet.**—*J. agric. food Chem.* **6,** 516-518. [Authors' summary modified.] **4010**

Steers, lambs, and pigs fed endrin at dietary concentrations of 0·1 p.p.m. for 12 weeks showed little tendency to deposit endrin in the body tissues. After 12 weeks of administration at 0·25 p.p.m. the endrin content of the fat was not more than 0·2 p.p.m. Other tissues contained no detectable endrin.

BECZE, J. (1958). A DDT és a HCH, valamint a széntetraklorid hatása a kosok és bikák ondótermelésére. **[Effect of DDT, BHC and CCl_4 on semen production in bulls and rams.]** —*Mag. állator. Lapja* **13,** 40-44. [In Hungarian. Summaries in English and Russian.] **4011**

The semen of 24 Merino rams, 2½ years old, and 4 bulls weighing 800-1000 kg. was investigated before and after the following antiparasitic treatments: bathing in a solution containing 3% Tetocid and 0·045% BHC gamma isomer; bathing in pure water as control; administration by mouth of three 15-ml. doses of BHC and DDT in 10% oily solution, smearing with a soln. containing 5% Bentocid and 0·075% BHC isomer and i/m injections of carbon tetrachloride in 5-ml. doses to rams and in 40-ml. doses to bulls. No change was found in the quantity, pH value, density, motility, proportion of living and dead spermatozoa, redox values and thermoresistance of the semen on the 1st, 2nd, 3rd, 4th, 7th, and 11th days after treatment.—A. SEBESTENY.

LINKFIELD, R. L. & REID, W. M. (1958). **Newer acaricides and insecticides in the control of ectoparasites of poultry.**—*J. econ. Ent.* **51,** 188-190. **4012**

Increasing incidence of *Ornithonyssus* [*Liponyssus*] *sylviarum* in North America stimulated new work on insecticidal control. Hand dusting (4 g. per bird) with 5% Sevin powder [N-methyl-1-naphthyl carbamate], 1·5% dieldrin dust, 25% S-MP powder [dimethyl phthalate] and 25% PS-256 powder [2-ethylhexane-diol-1, 3] was ineffective. 5% Dow ET-57 dust (sampled as Dow ET-14, or Korlan), 10% Sulphenone dust and 5% Trithion dust showed promise and were further used in field tests, but only Dow ET-57 and Trithion proved fully effective. 5% Dow ET-57 dust eradicated *Eomenacanthus stramineus, Menopon gallinae, Lipeurus caponis* and *Goniocotes gallinae* from 195 hens in one field trial, and 5% malathion dust was completely successful against *Echidnophaga gallinacea*.

No egg taint or toxicity to birds were noticed with Dow ET-57 or Trithion in these tests.—W. N. BEESLEY.

BOTTI, L., PIEROTTI, P. & EMDIN, R. (1958). Localizzazione da linguatula in cuore bovino. **[Linguatula in the heart in cattle.]** — *Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 723-726. [Summaries in English and French.] **4013**

A nodule, the size of a hazel nut, was observed beneath the endocardium of the left ventricle in a young slaughter bull. This was of a hard, elastic consistency with a fibrous capsule and a necrotic centre of a greenish yellow colour

containing the degenerating remains of a parasite identified as the larval form of a *Linguatula*. Minute examination of other organs and of mesenteric lymph nodes failed to reveal similar lesions. The microscopic appearance of the lesion is described. The authors state that they have frequently encountered such lesions in slaughter cattle but, although the parasitic nature of the lesion was suspected on former occasions, confirmation was not possible.—T.E.G.R.

See also absts. **3931** (tick eradication for control of piroplasmosis); **3953** (Western equine encephalomyelitis virus from mosquitoes); **3961** (arthropod-transmitted "Kisenyi sheep disease"); **3970** (arthropod-transmitted rabbit papillomatosis); **4067** (skin diseases affecting leather).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

GRIGORYAN, G. A., AKOPYAN, V. D., KHANBEGYAN, R. A., VEGAPETYAN, V. G. & AIVAZYAN, A. A. (1958). **[Use of tin arsenate against *Avitellina* infestation of sheep.]**—*Veterinariya, Moscow* **35,** No. 4. pp. 43-44. [In Russian. Summary in English.] **4014**

An epidemic of *Avitellina* infestation in sheep was controlled by dosing 13,000 adult animals each with 1 g. of tin arsenate by mouth. Deaths ceased within 2-3 days after treatment. No toxic effects were observed. [See also *V.B.* **28,** 1813.]—M.G.G.

I. GOODCHILD, C. G. (1958). **Transfaunation and repair of damage in the rat tapeworm, *Hymenolepis diminuta*.**—*J. Parasit.* **44,** 345-351. **4015**

II. GOODCHILD, C. G. (1958). **Growth and maturation of the cestode *Hymenolepis diminuta* in bileless hosts.**—*Ibid.* 352-362. **4016**

I. This paper deals with results of infections of *Hymenolepis diminuta* in altered hosts. It is concerned with proof that surgical transfaunation is a successful method of achieving infections, and with results of experiments in which tapeworms have been implanted after mutilations to test their powers of repair or regeneration. Subsequent reports will discuss the effects on tapeworms implanted in hosts altered in other ways.

II. With few exceptions, tapeworms have resisted attempts at *in vitro* cultivation. Failure is partly due to incomplete knowledge of their normal requirements. Since the enteric habitat is complex, their total requirements are extremely difficult to determine in normal infections. However, by altering this environment factor by factor, relative dependencies on normal factors may be assessed.

In the present work, rat hosts have had their biliary flow to the small intestine altered by surgery and have been subsequently challenged by infective cysticercoids or implanted adult *H. diminuta*. Survival, growth, and maturation rates of these cestodes have then been determined after varying periods in these surgically altered hosts.—R.M.

OŠMARIN, P. G., OPARIN, P. G. & RUMMEL, A. G. (1958). Význam slimáka *Radix lagotus* v epizootológii hymenolepidózy domácich kačíc vyvolávanej *Hymenolepis microsoma*. **[Role of the slug *Radix lagotus* in *Hymenolepis microsoma* infestation in ducks.]**—*Vet. Čas.* **7,** 307-312. [In Slovak. Summaries in English, French, German and Russian.] **4017**

In this paper, which has been translated from the original Russian into Slovak, the authors discussed the role of the slug *Radix lagotus* in *Hymenolepis microsoma* infestation in ducks. Five ducklings were fed slugs harbouring encysted larvae of the cestode, and, when killed later at various intervals, mature *H. microsoma* were demonstrated in the intestine.—E.G.

GINSBERG, A. (1958). **Helminthic zoonoses in meat inspection.** — *Bull. epiz. Dis. Afr.* **6,** 141-149. [Summary in French pp. 190-192. Author's summary modified.] **4018**

Some meat-borne helminthic zoonoses which may be encountered during meat inspection in Kenya are discussed.

Hydatidosis in sheep and goats has a high incidence but the number of human cases is comparatively small and it is suggested that wild carnivora and not the domestic dog are the main carriers of echinococcus. The problem is primarily economic as a very high percentage of the viscera of sheep and goats are condemned.

Cysticercosis in cattle is a serious problem for both the livestock producer and the meat industry; cysticercosis in 2 to 14-day-old calves is recorded.

Cysticercosis in pigs is still negligible but a slight increase has been noted recently.

Trichinosis, although not yet confirmed in Kenya, should not be overlooked as the rapidly expanding African pig production, the importation of pork products from Europe, and the influx of people whose eating habits favour the disease, may all lead to outbreaks.

Improved meat inspection which would result from more and better abattoirs throughout the country, health education and the

systematic use of taeniacidal drugs would do much to reduce the overall incidence of these diseases.

ŠIMŮNEK, J. (1958). Vliv příměsi tekutého parafinu na účinky subkutánně aplikovaného CCl_4 u ovci. **[Influence of the addition of liquid paraffin on the effect of subcutaneously applied carbon tetrachloride in sheep.]**—*Vet. Čas.* **7,** 96-110. [In Czech. Summaries in English, French, German and Russian.] **4019**

In 25 of 62 sheep treated with s/c doses of 1 ml./15 kg. body wt. of CCl_4 there was unrest, nervous excitement and apathy. Of 62 sheep given s/c doses of 2 ml./15 kg. body wt. of an equal mixture of CCl_4 and liquid paraffin 28 developed similar symptoms. CCl_4 was equally effective in both forms against fascioliasis but its use was not recommended because of the undesirable effects described.—E.G.

ZIMMERMANN, W. J., HUBBARD, E. D. & MATHEWS, J. (1958). **Studies on fecal transmission of** *Trichinella spiralis*.—*J. Parasit.* **44,** No. 4. Sect. 2. p. 34. [Authors' abst. modified.] **4020**

Previous studies have shown that 8 species of Iowa wildlife were infected with trichinella. In order to determine the possible importance of these reservoirs as vectors of trichinella to pigs, two modes of transmission have been considered, namely direct consumption of infected carcasses and faecal transmission from infected animals.

Faecal studies showed that viable larvae passed through the digestive tract with no apparent loss of infectivity.

TROMBA, F. G. (1958). **Observations on swine experimentally infected with the kidney worm,** *Stephanurus dentatus*. — *J. Parasit.* **44,** No. 4. Sect. 2. p. 29. **4021**

T. has previously reported that earthworms could serve as facultative intermediate hosts for *Stephanurus dentatus* [*V.B.* **25,** 3264]. Subsequent observations have been made throughout the prepatent period on additional pigs infected by feeding parasitized earthworms.—R.M.

BURROWS, R. B. (1958). **A new anthelmintic effective against** *Ancylostoma caninum*. — *J. Parasit.* **44,** No. 4. Sect. 2. p. 38. [Author's abst. modified.] **4022**

The N-benzyl-N,N-dimethyl-N-2-phenoxyethylammonium salts are active against a large number of intestinal nematodes, but appear to be more effective against those dwelling in the mucosa. Single doses of 20 mg./kg. or higher have eliminated all hookworms in dogs and cats and single doses of 10 mg./kg. have given almost complete clearance. The chloride kills hookworms *in vitro* in 15 to 20 min. at a 1:100 dilution and in about 40 min. at a 1:200 dilution.

WALLACE, W., EMRO, J. & JOHNSON, D. W. (1958). **Results from a one-year field trial on the effects of N-phenyl-N'-dichloroacetylpiperazine daily in the field on natural** *Ancylostoma caninum* **infections in dogs.**—*J. Parasit.* **44,** No. 4. Sect. 2. p. 38. [Authors' abst. modified.] **4023**

Laboratory trials indicated that continuous administration of N-phenyl-N-dichloroacetylpiperazine reduced hookworm egg-production markedly within 2 weeks and eliminated adult hookworms within 3 to 4 weeks. Observations were made for 1 year on the effect of this compound in a kennel. When fed daily at 20 mg. per kg. in dry food to 31 adult terriers, it reduced the hookworm egg counts appreciably.

STEWART, D. F. & GORDON, H. McL. (1958). **Immune reactions to** *Trichostrongylus colubriformis* **infestation in sheep.**—*Nature, Lond.* **181,** 921. **4024**

Larvae and adult worms of *T. colubriformis* stimulate, in sheep, the production of antibodies demonstrable by c.f. test with an antigen prepared from ground larvae. After challenge of infested sheep with a further dose of larvae, the body weights remained static or declined, although the faecal worm-egg count was virtually negative and the serum titre remained at a high level. Numerous adult worms were recovered, P.M., from the small intestine of such sheep but few eggs were present in the females. In one lamb, from which about 20,000 worms were recovered, the serum titre had risen to 1:40 three weeks after challenge with 20,000 larvae and remained at 1:40 or 1:80 until the lamb was slaughtered nine weeks later. During this period the worm-egg count never exceeded 400/g. faeces. Further experiments revealed that the worms matured in the normal time but the females produced very few eggs. It was apparent, in these cases, that there is a suppression of egg production associated with a sustained high serum titre and that the worm-egg count is not then a reliable indication of the degree of infestation. A similar phenomenon has been noted by Roberts in infestations of cattle with *Haemonchus contortus* [*V.B.* **28,** 3633].
—T.E.G.R.

DRUDGE, J. H., LELAND, S. E., JR., WYANT, Z. N. & ELAM, G. W. (1958). **Observations**

on the resistance of a strain of *Haemonchus* thiazine. — *J. Parasit.* **44,** No. 4. Sect. 2. *contortus* **to single therapeutic doses of pheno-** p. 40. **4025**

In 7 experiments, using 42 lambs raised helminth-free, phenothiazine was consistently more effective in removing a control strain (A) of *H. contortus* than a resistant strain (B). The present observations are an extension of the previous studies on these 2 strains; strain B had a phenothiazine threshold 4 to 8 times higher than strain A. [See also *V.B.* **27,** 2743.]—R.M.

STEWART, T. B. (1958). **Resistance of cattle to infection with** *Cooperia punctata.* — *Proc. helm. Soc. Wash.* **25,** 131-132. [Author's summary.] **4026**

The acquired resistance of steers to *Cooperia punctata* was inhibitory to the ex-sheathing and further development of larvae of *C. punctata.* The resistance may also sometimes manifest itself by preventing larvae from passing normally from the abomasum into the small intestine.

VEGORS, H. H. (1958). **Observations on inhibited development of cattle nematodes.**—*Proc. helm. Soc. Wash.* **25,** 86-90. [Author's summary modified.] **4027**

A high proportion of parasitic larvae present in cattle at the end of a period of grazing persisted as larval forms for an additional period of 28 days after the animals were transferred to a barn. The great majority of fourth-stage larvae recovered at necropsy from eight animals after barn confinement for this period were *Ostertagia ostertagi;* a few *Cooperia* spp. larvae also were present. *Trichostrongylus axei* apparently did not remain in an arrested stage of development.

TARSHIS, I. B. (1958). **A preliminary study of lateral migration by infective larvae of some cattle nematodes on experimentally contaminated forage plots.**—*Proc. helm. Soc. Wash.* **25,** 99-106. [Author's summary modified.] **4028**

The lateral migration of infective-stage larvae of cattle nematodes on three different forages was studied in two experiments in a greenhouse and in two outdoor experiments. The extent of migration in 24, 48 and 72 hours was determined. In the indoor experiments, larvae of a mixture of common species of cattle parasites were used and some larvae migrated laterally as much as 16 inches. In the outdoor experiments only *Cooperia punctata* larvae were used, and none migrated laterally more than 8 inches. These larvae migrated greater distances than previous reports indicated they might.

GIBSON, T. E. (1958). **The development and survival of the preparasitic stages of *Nematodirus* spp. on pasture herbage.**—*J. comp. Path.* **68,** 338-344. [Author's conclusions modified.] **4029**

Faecal pellets containing eggs of *N. filicollis* and *N. battus* were placed on grass plots one foot square at monthly intervals over a period of 14 months, and the survival of the eggs and larvae was observed for the following year. The eggs of *N. filicollis* developed more rapidly than those of *N. battus*; the eggs of the latter did not hatch, at the earliest, until the spring after their arrival on pasture. All the various preparasitic stages appeared capable of surviving the winter. The significance of these findings in the control of nematodirus disease is discussed.

ROSE, J. (1958). **Site of development of the lungworm *Muellerius capillaris* in experimentally infected lambs.**—*J. comp. Path.* **68,** 359-362. [Author's conclusions modified.] **4030**

Four lambs were each given 60 to 70 infective larvae of *M. capillaris* on 5 consecutive days every week for 44 weeks. They were then slaughtered and the lungs examined. It was established that development from fourth-stage larva to adult worm takes place within lesions in lung tissue. The observations did not support the idea that the adult lungworms live for some time in the arterioles. As a result of the reaction of the hosts' tissues enclosing the parasite within a lesion, many lungworms become isolated; consequently not all females produce fertile eggs. It is possible for no fertile eggs and first-stage larvae to be produced even though many worms are present in the lungs. The examination of faeces is, therefore, of very limited use in diagnosing the infection.

SENEVIRATNA, P. (1958). **Parasitic bronchitis in cats due to the nematode *Anafilaroides rostratus* Gerichter, 1949.** — *J. comp. Path.* **68,** 352-358. [Author's conclusions modified.] **4031**

Infection of cats with *A. rostratus* caused chronic bronchitis and peribronchitis with hyperplasia of the bronchial mucosa. The only symptom was a mild cough. The infection has been recorded solely in Palestine and in the Kandy district of Ceylon. Stibophen i/m or s/c at the rate of 0·2 ml. per kg. body wt. gave encouraging results but appeared to be toxic.

LUND, E. E. (1958). **Studies on "self-cure" and acquired resistance to *Heterakis* infections in chickens and turkeys.** — *J. Parasit.* **44,** No. 4. Sect. 2. p. 27. **4032**

It is concluded that *Heterakis* larvae developing in chickens and turkeys have little or no effect on mature worms already present, but that in 4 weeks the host has developed some resistance as a result of the earlier infection. This resistance may be expressed as a diminution in numbers of larvae, and to some extent in retardation in development.—R.M.

SOULSBY, E. J. L. (1958). **Studies on the heterophile antibodies associated with helminth infections. II. Heterophile antibody in *Ascaris lumbricoides* infection in pigs.**—*J. comp. Path.* **68,** 345-351. [Author's conclusions modified.] **4033**

Infection of pigs with *A. lumbricoides* stimulated the formation of a heterophile antibody, detectable by the direct conglutination test, and sometimes reaching high concentrations. This antibody, which followed the course of other anti-ascarid antibodies, had a very low haemolytic ability and is thought to be comparable to an antibody of low molecular weight found in rabbits inoculated with sheep r.b.c.

BOTTI, L. (1958). Sui nodulini miliarici parassitari in rene di cane — Identificazione delle forme larvali infestanti e riproduzione sperimentale. **[Miliary parasitic nodules in the kidney of dogs, caused by *Toxocara canis*.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 737-740. [Summaries in English and French.] **4034**

Three types of nodules were described. The first consisted of a necrotic centre containing tubules in various regressive stages and one or more nematode larvae; young, well vascularized granulation tissue, with histiocyte and plasma-cell infiltration, separated the necrosed area from the parenchyma. The second consisted of a thick capsule containing a large necrotic centre with areas of calcification and remains of larvae. The third consisted entirely of old connective tissue with slight histiocyte and plasma-cell infiltration; calcified centres were also encountered occasionally. The parasites associated with the lesions were larvae of *T. canis*. The lesions were reproduced experimentally in puppies by oral administration of embryonated eggs of *T. canis*.—T.E.G.R.

GÜRALP, N. (1957). Köpek ve kedi askaritlerinin tedavisinde piperazine adipate'la yaptığımız deneyler ve aldığımız sonuçlar. **[Helminth infestation in dogs and cats in Ankara and piperazine adipate treatment.]**—*Vet. Fak. Derg.* **4,** 42-51. [In Turkish. Abst. from English summary.] **4035**

Of a number of dogs examined in Ankara, about 28% harboured ascarid worms. Of these about 54% were infested with *Toxocara canis*, 39% with *Toxascaris leonina*, and 7% with *Ascaris lumbricoides*. About 35% of cats seen were infested, 94% with *Toxocara cati*, and 6% with both *T. cati* and *Toxascaris leonina*. Piperazine adipate, in doses of 100 mg./lb. body wt., was fully effective for dogs. Cats responded to one single dose of 250 mg. About 80% of ova taken from dog ascarids eliminated by the action of the anthelmintic, hatched under experimental conditions. Piperazine adipate was, however, ineffective against dog cestodes and *Isospora felis*.—E.G.

SHELTON, G. C., MAGNER, J. M. & SANTMYER, P. H. (1958). **Control of the common poultry ascarid by treating the soil with sodium pentachlorophenate.** — *J. Helminth.* **32,** 45-48. [Authors' summary modified.] **4036**

Pens previously infested with eggs of *Ascaridia lineata* were sprayed with formulations containing either sodium pentachlorophenate, an alkyl polyamine, or 2-benzyl-4-chlorophenol.

Six-week-old chicks were placed in the treated pens for eight days, then killed. The larval ascarids recovered from the intestines were counted.

Treatment with sodium pentachlorophenate reduced the worm burden in susceptible chicks by almost 65%. The other compounds appeared to be relatively ineffective.

BAILEY, W. S. & RIBELIN, W. E. (1958). **Observations on the association of esophageal sarcomas with *Spirocerca lupi* infection in the dog.**—*J. Parasit.* **44,** No. 4. Sect. 2. p. 28. [Authors' abst. modified.] **4037**

Sixteen cases of oesophageal sarcoma (fibrosarcoma or osteosarcoma) were encountered in 1,969 dogs examined P.M. during the period 1950–57. All of these occurred in the 163 dogs of this group infected with *Spirocerca*. Most of the malignant neoplasms were in hounds or bird dogs.

MALEK, E. A. (1958). **Occurrence of *Onchocerca armillata* Railliet and Henry, 1909, in Sudanese cattle, *Bos indicus*.**—*J. Parasit.* **44,** No. 4. Sect. 2. pp. 30-31. [Author's abst. modified.] **4038**

O. armillata is common in Sudanese zebu cattle; it inhabits the thoracic portion of the aorta and the brachiocephalic trunk. The average incidence in slaughtered cattle was 94% in White Nile cattle and 96% in cattle imported from Kordofan and Darfur provinces in the west. Incidence was also very high in the southern provinces. Specimens of the generically close *Elæophora* (*E. poeli*), which has the same habitat as *O. armillata,* have not yet been obtained from cattle in the Republic of the Sudan, but are believed to be common in the buffalo.

See also absts. **3917-3918** (blackhead); **3990** (counting helminth eggs and protozoan cysts in faeces).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

ANDERSON, W. A., MONLUX, A. W. & DAVIS, C. L. (1958). **Epithelial tumors of the bovine gallbladder—a report of eighteen cases.**—*Amer. J. vet. Res.* **19,** 58-65. **4039**

A well-illustrated account is given of 18 primary tumours of the bovine gall-bladder (17 papillary cystadenomas, and one papillary adenocarcinoma with local invasion of the liver and lymph-nodal metastasis). Ten of the tumours arose in the fundus of the gall-bladder. All except one of the 18 were solitary lesions. These tumours were usually detected at meat inspection by palpation of the gall-bladder: it is suggested that such tumours may be less uncommon than is generally supposed. The finding of gall-stones in one animal, and of liver fluke infestation in two, is considered to be merely incidental.
—E. COTCHIN.

YOST, D. H. & JONES, T. C. (1958). **Hemangiopericytoma in the dog.**—*Amer. J. vet. Res.* **19,** 159-163. **4040**

Haemangiopericytoma, reported in 1942 in man by Stout & Murray and in 1955 in the dog by Mulligan, and thought to be derived from the pericytes of Zimmermann, is a distinct neoplastic entity, occurring principally in the subcutis of the dog. The characteristic cells, spindle-shaped with ovoid nuclei, are arranged in laminated or whorled "finger-print" fashion about vascular spaces with endothelial linings (thus contrasting with haemangioendotheliomas). The vascular spaces may be open and contain blood, or collapsed, and only distinguishable when the capillary reticulin sheath is specially stained.

The majority of 33 neoplasms reported were firm, yellowish-white, frequently lobular, mostly firmly anchored to the deep tissues below movable skin. The average age of affected dogs at first notice was 10 years, and males predominated over females (2:1). In 13 of 23 animals, for which follow-up histories were available, the tumours recurred, usually at the original site: in only one dog was the recurrent tumour known to have appeared in less than one year after operation. In 2 dogs, widespread metastases occurred.—E. COTCHIN.

CELLO, R. M. & KENNEDY, P. C. (1957). **Hyperinsulinism in dogs due to pancreatic islet cell carcinoma.**—*Cornell Vet.* **47,** 538-557. **4041**

In an important article, which should be consulted in the original by both clinicians and pathologists, full clinical, diagnostic and pathological details are given of 3 male dogs showing symptoms associated with low fasting blood-glucose levels due to islet-cell pancreatic adenocarcinomas. Symptoms of weakness, dyspnoea, ataxia and convulsions of epileptiform type tended to occur at the end of periods of fasting, or after exercise. The symptoms were relieved by administration of glucose.

All three primary tumours were small, and appeared encapsulated, but metastases were present in all 3 dogs in the portal nodes, and in 2 in the liver. In 2 cases, operative removal of the pancreatic tumour was carried out: both dogs developed pancreatitis, in one case of an acute necrotic variety.

The clinical syndrome is a characteristic one, and can be differentiated from such conditions as encephalitis or brain tumour by the demonstration of subnormal blood-glucose levels after fasting.—E. COTCHIN.

ZIL'BER, L. A. & KRYUKOVA, I. N. (1958). **[Fibromatosis in rabbits caused by Rous virus.]**—*Vopros. Virusologii* **3,** 166-170. [In Russian.] **4042**

Day-old rabbits were given 4 daily [? subcutaneous] injections each of 1 ml. of a 1:4 suspension of Rous sarcoma in saline. 3 weeks after the last inj. multiple fibromata formed under the skin [? at the site of inj.] The growth of affected rabbits was studied. The process was less severe in rabbits inoculated with supernatant fluid after centrifugation of the suspension at 2,000 r.p.m. for 20 min. Suspensions of the fibromata set up sarcoma when inoculated into the sternal musculature of fowls.—R.M.

McCLELLAND, R. B. (1957). **X-ray therapy in malignant neoplastic diseases of small animals.**—*Cornell Vet.* **47,** 533-538. **4043**

Tables show the animals treated, location and type of lesion, relation to any surgical interference, dose used and results obtained in 75 cases of tumours of dogs and cats for which both histological diagnosis and survival details were available. The results with mammary carcinomas and malignant melanomas were generally poor, while mast-cell tumours responded well. For detailed results, see original article.

—E. COTCHIN.

NUTRITIONAL AND METABOLIC DISORDERS

READ, M. S., KRAYBILL, H. F. & WITT, N. F. (1958). **Short-term rat feeding studies with gamma-irradiated food products. I. Frozen stored foods.**—*J. Nutr.* **65,** 39-51. **4044**

Fourteen foods irradiated with three or six million rep and subsequently stored in the frozen state were fed *ad libitum* to rats for 8 to 12 weeks as 35% of the dry weight of the diet, and 13 of them were found to be non-toxic. Peaches irradiated with six million rep were slightly toxic, but those irradiated with three million were not.—R.M.

McGEADY, P. A. (1958). **Some aspects of bovine digestion and indigestion.**—*Irish vet. J.* **12,** 62-75. **4045**

The principles of ruminant digestion are discussed briefly. The author describes ruminant indigestion which includes overeating, impaction, bloat and poisoning, and gives symptoms and treatment. Accounts are given of traumatic gastritis, displacement of the abomasum, and intussussception.—E. J. CASTLE.

PHILLIPSON, A. T. & REID, C. S. W. (1958). **Distension of the rumen and salivary secretion.**—*Nature, Lond.* **181,** 1722-1723. **4046**

Adult sheep, and calves 5–8 months old were anaesthetized with chloralose and the rumen inflated with carbon dioxide, nitrogen or air to known pressures. Saliva was then collected from the parotid gland and in some cases the submaxillary glands. Increasing the pressure in the rumen to 20 mm. of mercury caused a fivefold increase in parotid secretion in one sheep, but there was no response to increases in pressure in the remaining four sheep. Pressures of 5 to 20 mm. increased parotid secretion in four of the five calves. Sub-maxillary secretion was increased only in one calf. The significance of these findings in relation to bloat is discussed.

—E. J. CASTLE.

SHINOZAKI, K. (1957). **Studies on experimental bloat in ruminants. 4. Identification of amines from rumen ingesta and passage of histamine across the rumen epithelium.** — *Tohoku J. agric. Res.* **8,** 149-154. [In English.] **4047**

The rumen contents of 6 sheep and 3 goats grazing pasture or fed ladino clover were examined by paper chromatography. Histamine was identified in all the animals, methylamine in seven and other amines only occasionally.

In 4 experiments on one sheep, histamine was poorly absorbed from an artificial rumen pouch.

When 1 or 3 g. of histamine dihydrochloride was introduced through the rumen fistulae of 2 sheep there was no apparent physiological change in their condition.

The findings suggest that histamine is not related to bloat.—E. J. CASTLE.

PLATT, B. S. (1958). **Malnutrition and the pathogenesis of disease.**—*Trans. R. Soc. trop. Med. Hyg.* **52,** 189-210. Discussion: pp. 211-216. **4048**

Evidence in support of interdependence in the pathogenesis of disease of zymotic and endocrine factors and malnutrition is presented. Experiments in rats and studies in colonial territories have indicted that the environment a mother provides is more potent than the genetic make-up in determining birth weight of the offspring. Food shortages are shared by mother and foetus and the effects of malnutrition on the mother are reflected in the state of nutrition of the offspring. Evidence is outlined of the influence of zymotic disease together with unsatisfactory feeding on the rate of growth in infancy, the appallingly high infant mortality rates in the Tropics, the onset of puberty, on pregnancy, lactation, the quality and quantity of the milk, and on adult life and old age. Low protein intake appears to affect the digestibility of a diet and produces changes in the enzyme content of tissues in man and experimental animals, while protein malnutrition and disease (particularly malaria) cause accumulation of fat and fibrosis in the liver. Nutritional, hormonal, and zymotic factors may all be implicated in the control of body water and oedema and may contribute to the production of transverse trabeculae or "arrested growth" lines in bones.

—A. ACKROYD.

JAFFE, W. P. & WAKELAM, J. A. (1958). **Growth promoting factors in malt distillers dried solubles. I. The effect of the mineral components.** —*Poult. Sci.* **37,** 520-529. [Authors' summary modified.] **4049**

The growth and food conversion efficiency of chicks responded to the addition of malt distillers' dried solubles to their semi-synthetic diet. The ash of these solubles also improved growth under certain circumstances but this response was abolished by raising the manganese content of the basal diet from 54 mg./lb. to 185 mg./lb.

INGRAM, P. L., SHILLIAM, K. W. G., HAWKINS, G. M. & ROY, J. H. B. (1958). **The nutritive value of colostrum for the calf. 14. Further studies on the effect of antibiotics on the performance of colostrum-deprived calves.**—*Brit. J. Nutr.* **12,** 203-215. **4050**

Thirty-eight new-born calves were deprived of colostrum and of these ten were given chlortetracycline (CT), ten penicillin (PN), ten both antibiotics and eight received no antibiotic. Ten similar calves were fed 6 pints of colostrum and no antibiotic.

Colostrum and CT significantly reduced deaths from white scours but PN had no beneficial action. PN mixed with CT antagonized the latter's beneficial effect.

Of the calves that died from white scours, localized intestinal lesions were found in calves fed colostrum or CT while signs of a generalized septicaemia were found in the others. The largest live weight gains occurred in calves fed CT, and the smallest weight/length ratio of the small intestine in calves fed PN. Strains of *Escherichia coli* from calves given PN were the most resistant to PN *in vitro,* and strains from calves given CT were the most resistant to CT.

—E. J. CASTLE.

SCHMIDT, E. G., PARKER, A. & COUNCILL, F. (1958). **The effect of antibiotics and chemotherapeutic agents on intestinal putrefaction.** —*Antibiot. & Chemother.* **8,** 327-337. [Summary in Spanish p. 377. Authors' summary modified.] **4051**

Twenty antibiotic and chemotherapeutic compounds were added to the diet of rats and the effects on intestinal putrefaction measured by determination of urinary phenol-*p*-cresol, aromatic hydroxy acids, and indican. Many of the drugs were inactive in this respect, even though some are good growth promoters for many species of animals. The inhibitory action, when present, was usually transitory at moderate concentrations. It is concluded that, in the rat, the inhibition of intestinal putrefaction is not a decisive factor in stimulation of growth by antibiotics. When the diet was supplemented with tyrosine there was no increased formation of volatile phenols and intestinal putrefaction was not inhibited by chlortetracycline. Chlorophyllin derivatives were inert, even at high concentrations.

MAMEESH, M. S. & JOHNSON, B. C. (1958). **The effect of penicillin on the intestinal synthesis of thiamine in the rat.**—*J. Nutr.* **65,** 161-167. [Authors' summary modified.] **4052**

By the use of radiocarbon-labelled thiamine it was found that the amount of available thiamine supplied by the intestinal microflora in rats given diets either adequate or limiting in the vitamin was increased in the presence of 50 mg. of penicillin per kg. of diet. The amounts of the available microbial thiamine under the different treatments were estimated. In rats which were fed a sucrose diet adequate in vitamins, no thiamine other than that supplied in the diet could be detected in the liver.

SHERMAN, W. C., DONOVAN, G. A., REYNOLDS, W. M. & LUTHER, H. G. (1958). **Nutritional evaluation of oleandomycin in poultry rations.** In *"Antibiotics Annual"* 1957-58. pp. 256-258. [New York: Medical Encyclopedia Inc.] [Authors' summary modified.] **4053**

Growth and feed efficiency responses with oleandomycin were two to three times the magnitude obtained with procaine penicillin.

The responses to 4 to 5 g./ton of oleandomycin were as great as with higher concentrations.

GÁSPÁR, Z. N. & TÓTH, B. L. (1958). **Absorption of carbohydrates in newborn animals.**—*Acta vet. hung.* **8,** 31-42. [In English.] **4054**

The absorption of glucose solution of 5·4, 10, 20, or 35% concentration was studied in 94 three-day-old kittens and puppies and 6 adult cats. The solution, 2 ml. for puppies and 1 ml. for kittens, was introduced into the stomach through a sound or injected directly into the duodenum, and the animal killed 15, 30 or 60 min. afterwards. The amounts of residual glucose in the stomach and in three arbitrary divisions of the small intestine were then measured.

Very little of the weaker solutions introduced into the stomach could be recovered after 60 min. although slightly more of the others remained. When the stomach was bypassed the weaker concentrations of glucose were absorbed much more rapidly, but at conc. over 20% this

made no difference. 10% glucose introduced directly into the duodenum of adult cats was not absorbed as quickly as in kittens.

—E. J. CASTLE.

CLARK, I. & GEOFFROY, R. (1958). **Studies in calcium metabolism.** — *J. biol. Chem.* **233,** 203-205. [Authors' summary modified.] **4055**

Subcutaneous administration of parathyroid extract, magesium sulphate and sodium citrate caused a rapid increased excretion of urinary radiocalcium, regardless of whether the isotope was given 2 days or 60 days before. On the basis of excretion data, their actions appear similar and indicate a direct osteolytic action on bone. Moveover, in animals treated 60 days before with the isotope, the increased urinary radiocalcium as a result of parathyroid extract, $MgSO_4$, or sodium citrate treatment must be derived from a storehouse of older bones and not from recently deposited calcium. The increased urinary excretion of calcium after hydrocortisone treatment appears to be the result of decreased bone formation accompanied by normal resorption.

All salts tested caused some hypercalciuria; however, only Mg and citrate ions resulted in a six to tenfold increase in urinary Ca^{45} and in a two to threefold increase in urinary Ca^{40} indicating a specific action of these substances upon bone.

URBÁNYI, L. (1958). Tájékoztató adatok fontosabb emlős háziállataink vérsarójának mészés foszfortartalmáról. **[Calcium and phosphorus content of serum in domestic animals.]** —*Mag. állator. Lapja* **13,** 45-46. [In Hungarian. Summaries in English and Russian.] **4056**

The calcium and inorganic phosphorus content of the blood sera of 82 cattle, 106 horses, 65 fat and bacon pigs and 14 sheep was investigated. The results were summarized in a table. The calcium and inorganic phosphorus content of the blood sera of these animals varied with age, breed, and to a lesser extent with sex. Phosphorus had a wider range of variation than calcium.—A. SEBESTENY.

HERNDON, J. F., RICE, E. G., TUCKER, R. G., VAN LOON, E. J. & GREENBERG, S. M. (1958). **Iron absorption and metabolism. III. The enhancement of iron absorption in rats by D-sorbitol.**—*J. Nutr.* **64,** 615-623. [Authors' summary modified.] **4057**

D-Sorbitol enhanced the absorption of iron in iron-depleted rats, as well as in normal rats receiving low levels of iron. Above a critical minimal level of sorbitol, iron adsorption was directly related to the amount of sorbitol orally administered with the iron. The possible mechanisms by which sorbitol and carbohydrate derivatives affect absorption are discussed.

BLACK, A. L. & KLEIBER, M. (1958). **The transfer of carbon from propionate to amino acids in intact cows.**—*J. biol. Chem.* **232,** 203-209. [Authors' summary modified.] **4058**

Five lactating cows were injected intravenously with propionate-1-C^{14} or propionate-2-C^{14}, and the radiocarbon level was measured in amino-acids recovered subsequently from casein. The results indicated that propionate is as important a precursor of aspartic acid and serine as it is of carbohydrate, and that propionate is not converted to pyruvate or glucose before its conversion to amino-acids, but is probably converted to succinate.

HARRIS, L. E., MADSEN, M. A., GREENWOOD, D. A., SHUPE, J. L. & RALEIGH, R. J. (1958). **Effect of various levels and sources of fluorine in the fattening ration of Columbia, Rambouillet and Targhee lambs.**—*J. agric. food Chem.* **6,** 365-368. **4059**

Hay containing up to 160 p.p.m. of fluorine on a dry basis, when mixed with 50% grain to make a ration containing 112 p.p.m. of fluorine on a dry basis, can be fed to lambs for 14 weeks without having measurable adverse effects upon fattening.—M.G.G.

MRAZ, F. R., JOHNSON, A. M. & PATRICK, H. (1958). **Metabolism of cesium and potassium in swine as indicated by cesium-134 and potassium-42.** — *J. Nutr.* **64,** 541-548. [Authors' summary modified.] **4060**

Sixty-two pigs were used in the three investigations reported. The first tested the influence of lucerne and oat hulls on the metabolism of orally administered caesium-134; the second, the influence of beet pulp on the metabolism of intraperitoneally administered caesium and potassium-42, and the third the influence of dietary potassium on the metabolism of intramuscularly administered caesium.

It was observed that lucerne and beet pulp increased faecal and total excretion of caesium and decreased the ratio of urinary to faecal caesium. Beet pulp increased faecal and total excretion of potassium but did not appreciably influence the ratio. A deficiency in dietary potassium is characterized by increase in tissue uptake and decrease in excretion of caesium.

USHIJIMA, J. (1958). **Biochemical studies on so-called osteomalacia** (*Osteodystrophia fibrosa*) **in horses. II. The relation between histological findings and chemical composition of the bone.**—*Jap. J. vet. Res.* **6,** 1-10. [In English. Author's summary modified.] **4061**

Chemical analysis was carried out on 65 nasal bones from 3 abattoirs in Hokkaido. Severe reduction of minerals (particularly bone ash, calcium and phosphorus) was found in diseased bone, together with a reduction of bone matrix, represented by total nitrogen content. A slight increase in magnesium content was found in the advanced stage with the proliferation of new bone tissue. The results indicate that this disease of horses differs from true osteomalacia.

See also abst. **4161** (book, feeding stuffs).

DISEASES, GENERAL

KOPPEL, Z. & POLONY, R. (1958). Niekol'ko poznámok k etiológii hromadného hynutia vodnej hydiny. Súčasný výskyt ornitózy a salmonelózy. [**Simultaneous infection with ornithosis and salmonellosis as cause of heavy losses on duck and goose farms.**]—*Vet. Čas.* **7,** 203-210. [In Slovak. Summaries in English, French, German and Russian.] **4062**

Mortality among nearly 20,000 ducks and geese in 20 rearing establishments was investigated. On some farms losses amounted to nearly 35%. Psittacosis virus was isolated from material collected on four duck farms and one flock of geese, together with *Salmonella typhimurium, S. anatum* and *S. meleagridis*. Psittacosis was also diagnosed in a girl employed on one of the duck farms.—E.G.

WOOD, W. B., JR. (1958). **The role of endogenous pyrogen in the genesis of fever.**—*Lancet* July 12th, 53-56. [Author's summary modified.] **4063**

There is now strong experimental evidence that endogenous pyrogen derived from polymorphonuclear leucocytes in inflammatory exudates plays a central role in the pathogenesis of many kinds of fever. Leucocytes in granulocytic exudates release the endogenous pyrogen into the surrounding medium while still functionally active.

During the febrile phase of experimental pneumococcal peritonitis the pyrogen has been found not only in the peritoneal exudate and the thoracic-duct lymph but also in the bloodstream.

An endogenous pyrogen indistinguishable from leucocytic pyrogen has likewise been detected in the sera of rabbits with pyrexia resulting from acute streptococcal cellulitis, from tuberculin hypersensitivity, and from the intravenous injection of typhoid vaccine and of influenzal virus.

This recently identified circulating factor acts directly on the thermoregulatory centres of the brain.

Its biological properties differ distinctly from those of bacterial pyrogens, pyrexin, and the pyrogenic polysaccharides.

Despite the progress achieved in elucidating the pathogenesis of fever, two major problems remain unsolved: (1) the chemical identity of leucocytic pyrogen; and (2) the possibility that cells other than polymorphonuclear leucocytes may be able to elaborate a similar, if not identical, fever-producing factor.

LITTLEJOHN, A. (1958). **Mesenteric thrombosis in equines: with a note on a possible line of treatment.**—*J. S. Afr. vet. med. Ass.* **29,** 67-69. **4064**

L. described mesenteric thrombosis in 5 horses. Although diagnosis is difficult the following signs serve as a guide. Colic is continuous and varies in severity according to the extent of the thrombus. Flatulence is absent and peristalsis and defaecation cease. In one case the author used intravenous injections of sodium nitrite to allay symptoms and suggests that this form of treatment could be used to prolong the life of valuable animals for a short period.

—T. E. GIBSON.

SCHLEITER, H., DIETZ, O. & GRUNER, J. (1958). Zur Diagnostik der Pericarditis des Rindes. [**Diagnosis of pericarditis in cattle.**] — *Schweiz. Arch. Tierheilk.* **100,** 123-134. [Summaries in English, French and Italian.] **4065**

Four forms of pericarditis occur in cattle: tuberculous, leucotic, purulent and fibrotic, all usually fatal. The available means of operating on traumatic cases of pericarditis by the introduction of intubation-anaesthesia, however, require accurate and early diagnosis. The various symptoms are described. The ECG is a valuable aid in the differential diagnosis of traumatic pericarditis; a number of graphs are reproduced. It is concluded that differentiation of the various

forms of pericarditis in an advanced stage is possible whereas it is often impossible in early cases.—E. S. FOUNTAIN.

MORA, A. & DEL GIUDICE, V. (1958). Sulla frequente presenza di infarti ischemici renali nella specie bovina. **[Renal infarcts in cattle.]** —*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11**, 752-755. [Summaries in English and French.] **4066**

A brief note on renal infarcts, which have been frequently encountered by the authors in slaughter animals and the aetiology of which is obscure.—T.E.G.R.

GREEN, H. F. (1957). **A survey of skin diseases of cattle in Kenya and their effect on the finished leather.**—*J. Soc. Leath. Tr. Chem.* **41**, 418-424. [Author's summary modified.] **4067**

The diseases are described and illustrated as they appeared on the dry raw hides, in sections through lesions and on the finished leather. In 1,000 low grade hides *Demodex* infection and streptothricosis were the most prevalent (incidence of 32% and 19%); the former was the most damaging to the leather. Photosensitization (4%), ringworm (3%), and mange (1%) were also found. A similar survey of indigenous sheep skins is being undertaken.

UEDA, A. & ONO, T. (1958). **[An ailment with muscle degeneration among lambs in the Tokachi district, Hokkaido.]** — *J. Jap. vet. med. Ass.* **11**, 30-32. [In Japanese.] **4068**

Since 1923 several authors have reported this condition under different names. The present authors describe the clinical and pathological findings on 8 sporadic cases observed from 1952 to 1957 among Corriedale lambs on small farms.

The authors suggested that the main predisposing factors to this disease were breed and age, and that suppurative ailments played an important role. Pathologically, cases could be classified as a bacterial toxicosis or idiopathic muscular degeneration; 2 cases were of the former and 6 of the latter type.—KOGI SAITO.

WATSON, R. H. & MURNANE, D. (1958). **Non-contagious ovine posthitis ("sheath rot"): some aspects of its course and etiology.**—*Aust. vet. J.* **34**, 125-136. **4069**

The incidence of non-contagious posthitis in Corriedale wethers showed pronounced seasonal fluctuations. It was low during the dry summer months and rapidly increased during autumn, reaching a peak during August or early September. A steep decrease occurred during the spring. The origin of the disease is probably dietary, and removal of affected sheep from a predominantly rye-grass pasture to one consisting mainly of capeweed, or to a diet of oat hay, caused rapid resolution of the lesions.

—A. W. BLACKSHAW.

BALBIERZ, H. (1957). Obumieranie (martwica) ogonów u prosiąt osesków. **[Necrosis of the tail in piglets.]**—*Weterynaria, Wrocław.* No. 3. pp. 169-178. [In Polish. Summary in German.] **4070**

B. gives his own view on the cause and pathogenesis of tail necrosis in piglets: that diarrhoea is the origin; that the tail becomes coated with faeces and the slow drying of this coating lowers the temperature and constricts the blood vessels, leading to necrosis and sloughing of the tail. He reproduced the condition experimentally in three of four 12-day-old piglets, in which the upper part of the tail was sprinkled with ethyl chloride 5 times for 3 sec. with 5 sec. intervals, and in all of 4 which were dosed with 5 g. of magnesium sulphate in 5 ml. of distilled water and were subsequently scouring.—M. GITTER.

WEXLER, B. C. & MILLER, B. F. (1958). **Severe arteriosclerosis and other diseases in the rat produced by corticotrophin.** — *Science* **127**, 590-591. **4071**

Discarded breeding rats, about 1 year old, received ACTH s/c 3 times a week for up to 7 weeks. The dosage was 0·333 of a unit per 100 g. body wt. P.M. examination revealed extremely severe arteriosclerosis in females, and in males polyarteritis nodosa, gastric ulcers, testicular atrophy and renal calculi, but no arteriosclerosis. Young weaned rats which were treated similarly showed little gross change. Preliminary experiments suggested that stress, such as exposure to cold and heat, also induces arteriosclerosis in aged breeding rats.—M.G.G.

FLOWERS, A. I., GRUMBLES, L. C., DUBOSE, R. T. & DELAPLANE, J. P. (1958). **Cataracts: a new flock problem in chickens.**—*Poult. Sci.* **37**, 420-422. [Authors' summary modified.] **4072**

Cataract of unknown aetiology was observed in 24 flocks of chickens of 7 breeds or crosses obtained from 7 hatcheries in 3 States. Affected birds were aged from 3 weeks to over 6 months, but the condition was seen most frequently in birds aged 6 to 12 weeks. Morbidity ranged from 1% to 30% with an average rate of about 5%. Mortality was low and apparently due to starvation. Limited attempts to isolate

an infective agent were negative and attempts at transmission were also negative or inconclusive. [See also *V.B.* **28,** 1552.]

HALEY, T. J., FLESHER, A. M. & KOMESU, N. (1958). **Effect of gamma-irradiation on blood copper and magnesium in the burro.**—*Radiation Res.* **8,** 535-538. **4073**

Plasma copper levels in the donkey increased following exposure to lethal doses of gamma-rays from radiocobalt, whereas plasma magnesium levels decreased. Normal plasma copper levels varied from 112 to 184 μg.% and plasma magnesium levels varied from 1·98 to 2·30 mg.%.

ROSENFELD, G. (1958). **Functional studies of the calf adrenal cortex following total-body exposure to a single lethal dose of γ-radiation.**—*Radiation Res.* **9,** 173. **4074**

The influence of a lethal dose of whole-body γ-radiation (600 r) on adrenocortical function was investigated by removing the adrenals of irradiated calves at various intervals after exposure, and perfusing glands with an oxygenated medium containing either added steroid substrates or ACTH.

Adrenocortical dysgenesis did not occur despite the development of generalized sepsis, toxaemia, haemorrhage, anaemia, and the other severe disturbances associated with death from radiation sickness.—R.M.

BUSTAD, L. K., GEORGE, L. A., MARKS, S., CLARKE, W. J., SEIGNEUR, J., HORSTMAN, V. G., BARNES, C. M., HACKETT, P. L. & KORNBERG, H. A. (1958). **Biological effects of I^{131} in sheep and swine.**—*Radiation Res.* **9,** 97-98. [Authors' abst. modified.] **4075**

The effects of radioiodine on sheep have already been reported [*V.B.* **27,** 2476 & 3644; **28,** 176]. Pigs maintained on two levels of nutrition exhibited differences in thyroid metabolism after I^{131} administration. Consistently greater uptake of radio-iodine was observed in pigs on a high level of nutrition, but they showed thyroid damage after feeding of 45 μc/day no sooner than the pigs on a low level of nutrition. Changes in blood constituents are described in both sheep and pigs. The patterns of iodine uptake and concentration in the developing foetal thyroid gland of both species were discussed.

SHIVELY, J. N. & OTHERS. (1958). **Survival studies on swine previously exposed to the gamma-neutron flux of a nuclear detonation.**—*Radiation Res.* **9,** 182. [Authors' summary modified.] **4076**

One hundred and eleven pigs exposed to a nuclear detonation were studied. Based on comparisons with control groups, pigs from groups exposed to 268 rep or greater had significantly lower white blood cell counts two months after exposure. Seven months after exposure only those groups exposed to 515 and 615 rep had low white cell counts. Damage to eyes or skin was not observed. Nine irradiated pigs died between 30 and 270 days after exposure, but examination revealed no lesions directly attributable to radiation, except in one animal which died on the 42nd day. Four months after exposure 48 pigs, most of which had received up to 268 rep, were re-exposed to X-rays. The lethal dose was not different from that observed on primary exposure.

HORAVA, A. & TESSMER, C. F. (1958). **Cytologic and histologic changes in spleen of swine exposed locally to continuous point-source γ-radiation from Co^{60} bead.**—*Radiation Res.* **9,** 130-131. **4077**

Beads made of radiocobalt alloy were affixed to the capsule of the spleen of pigs. Before implantation the radiation from each bead averaged 3 mc. Animals were killed 2, 4, 8 or 16 days after implantation. After 8 days the minimum dose delivered to splenic tissue was 29,714 rep up to 5 mm. from the bead, 2,057 rep at between 10 and 20 mm., and 114 rep at between 40 and 80 mm. In irradiated areas there was particularly rapid replacement of destroyed lymphocytes; mitotic activity in the germinal centre of lymphatic follicles; persistent and severe injury to reticulum cells; prolonged depletion of red pulp; collapse of collagen and reticular framework; accumulation of atypical reticulum cells.—R.M.

SHULTZ, F. T. & ANDERSEN, A. C. (1958). **Reproductive fitness in female dogs exposed to whole-body X-radiation.**—*Radiation Res.* **9,** 182. [Authors' abst. modified.] **4078**

Three groups of virgin female Beagles aged 10-12 months were exposed to 100 r or 300 r of X-rays. Bitches which survived were mated on successive oestrous periods until two litters were produced. Preliminary results indicate that reproductive ability of survivors was not impaired with respect to litter size and puppy mortality, and that reproductive fitness of the total population was impaired primarily as the result of acute radiation losses.

STOVER, B. J., ATHERTON, D. R. & KELLER, N. (1958). **Pu^{239} metabolism in adult beagle dogs.**—*Radiation Res.* **9,** 188-189. **4079**

Since the long-term effects of plutonium were of primary interest in this experiment, the

metabolic studies covered four years following a single i/v inj. of tetravalent plutonium in citrate buffer. Most of the plutonium was deposited in the skeleton and the liver.—R.M.

CASARETT, G. W., CONLEY, J., HENDERSON, B. J. & TUTTLE, L. W. (1958). **Late pathologic effects of imbibed Sr^{90} in bones of rats.**—*Radiation Res.* **9**, 100. [Authors' abst. modified.] **4080**

Rats of different ages imbibed (in water) in 10 or 30 days total doses sufficient to result in skeletal retentions of about 1 to 50 μc after 2 months. Rats aged 415 days, given a skeletal retention of 1 μc (10-day dosage) and dying within the last 22 months had no osteosarcoma, but there was radiation injury of bone-marrow and zones of endochondral bone formation. This was true also of 335-day-old rats given skeletal retention of 2 μc (10-day dosage) and dying within the last 15 months. Rats aged 87 days given skeletal retention of 15 μc (30-day dosage) and dying within the last 13 months had a high incidence of osteosarcomata, some leucaemia, considerable life shortening, and damage to bone and bone-marrow. Rats, 30 days old, given skeletal retention of 50 μc (10-day dosage) had shorter life and severe damage to bone-marrow and bone, and some bone tumours.

ANDERSEN, A. C., KOHN, H. I. & WOOTEN, E. (1958). **On the pathogenesis of hemorrhagic lesions following whole-body X-ray exposures.**—*Radiation Res.* **9**, 86. [Authors' abst. modified.] **4081**

It has long been observed that the severity of haemorrhage after lethal exposure to X-rays varies greatly in different animal species. For instance, 275 r result in massive haemorrhagic lesions in the pig, while 800 r in rabbits seldom cause marked haemorrhage. Experiments on mouse, rat, hamster, guinea-pig, dog, and pig indicate that the degree of haemorrhage correlates with the size and amount of intravascular globules that are positive to periodic acid–Schiff and are thought to be polysaccharide in nature. These globules may be seen with ease in the pig and dog, with difficulty in the g.pig, and are practically absent in other species. Such globules may conceivably act as emboli and induce endothelial damage, which, in the presence of other predisposing factors, such as thrombocytopenia, would lead to haemorrhage. The liver is tentatively regarded as the source of the globules.

BRYANT, F. J., CHAMBERLAIN, A. C., MORGAN, A. & SPICER, G. S. (1957). **Radiostrontium in soil, grass, milk and bone in the United Kingdom : 1956 results.** pp. 24. Harwell, Atomic Energy Research Establishment. [AERE HP/R 2353] [Authors' abst. modified.] **4082**

The results of radiostrontium analysis of soil, grass and sheep bone from 12 stations in England and Wales are given. The strontium in the top 4 inches of undisturbed soil in July 1956, ranged from 1·9 to 10 mc./km^2., depending on the rainfall. The Sr activity of herbage and of sheep bone showed a wider range, samples from acid hill soils being more active. Milk from Somerset had a median activity of 4·4 $\mu\mu$c Sr per g. Ca in 1956, compared with 4·1 in 1955. In specimens of human bone obtained in 1956 the degree of Sr activity depended on age. The average concentration in children under 5 years old was 0·7 $\mu\mu$c Sr/g. Ca, and the average bone dose 2 mrad/year.

JOWSEY, J., ROWLAND, R. E. & MARSHALL, J. H. (1958). **The deposition of the rare earths in bone.**—*Radiation Res.* **8**, 490-501. [Authors' summary modified.] **4083**

After intraperitoneal injection, the rare earth isotopes Y^{91}, Ce^{144}, and Tm^{170} are taken up in the skeleton and appear on non-growing bone surfaces, which micro-radiographs show to be highly calcified. They are not found in osteoid tissue.

JAGGER, J. (1958). **Photoreactivation.**—*Bact. Rev.* **22**, 99-142. **4084**

After describing what is meant by photoreactivation and considering some of the experimental data concerning the wave length of inactivating and reactivating light and the very wide range of biological materials and properties in which photoreactivation has been observed, (ranging from reactivation *in vitro* of genetic properties of nucleic acid molecules to prevention of death in mammals), research done on photoreactivation between 1952 and 1958 is reviewed and current hypotheses concerning it are discussed. Photoreactivation is now defined as the restoration of ultra-violet radiation lesions in a biological system with light of a longer wave length than that of the damaging radiation.

—A. ACKROYD.

BRAUSIL, B. (1958). **An abnormal type of lymphocyte.**—*Nature, Lond.* **181**, 846. **4085**

A description of an abnormal type of lymphocyte found in blood smears, bone-marrow and splenic puncture of 9 patients with hepatosplenomegaly. These cells appear to have an inconstant morphology. The nucleus is of vari-

able shape and the chromatin is laid down as a fine network instead of the nomal compact masses. The cytoplasm when present has a fringed periphery. P.M. examination of 5 of the patients revealed a rare form of tuberculosis.

—W. E. PARISH.

POISONS AND POISONING

LENIHAN, J. M. A., SMITH, H. & CHALMERS, J. G. (1958). **Arsenic in detergents.**—*Nature, Lond.* **181,** 1463-1464. **4086**

Estimations of the arsenical content in p.p.m of 8 common undiluted detergents (modified method of Thomas & Collier) showed levels ranging from 74 and 59 to 5. Representations to the manufacturers resulted in practical elimination of the arsenic by replacing the arsenical sulphuric acid, used in the sulphation process, by acid derived wholly from sulphur.

—J. PASFIELD.

SÁVAY, G. & CSILLIK, B. (1958). **Lead-reactive substances in myoneural synapses.**—*Nature, Lond.* **181,** 1137-1138. **4087**

Diaphragms of rats were fixed for 15 min. in 8% formol containing 5% lead nitrate. Frozen sections of 30–40 μ were cut, washed rapidly in distilled water and immersed in a 2% aq. soln. of sodium sulphide. The characteristic patterns of the subneural apparatus were then visible. The reaction did not take place if the muscle was frozen or incubated in distilled water before treatment with lead nitrate, although neither treatment affected cholinesterase activity. This suggests that the reaction with lead is not due to cholinesterase, but to a substance of lower molecular weight, such as cysteine, methionine or glutathione.—M.G.G.

MILLS, C. F., MONTY, K. J., ICHIHARA, A. & PEARSON, P. B. (1958). **Metabolic effects of molybdenum toxicity in the rat.** — *J. Nutr.* **65,** 129-142. [Authors' summary modified.] **4088**

The influence of high dietary intakes of molybdenum on certain enzyme systems of rat liver and kidney has been studied with particular reference to the metabolism of sulphur compounds.

The activity of sulphide oxidase in liver was depressed in molybdenum poisoning. High Mo intakes had apparently no effect on the activity of liver cysteine desulphhydrase in liver, on aryl sulphatase in kidney or on the oxidation of L-cysteine sulphinate by liver homogenates. Mo poisoning was probably accompanied by a derangement of protein metabolism.

Although a relatively high copper intake was maintained, no evidence was obtained to suggest that the limitations to growth imposed by Mo poisoning in the rat could be directly attributed to changes in the activity of enzyme systems normally sensitive to restrictions in the supply of physiologically available copper.

REHFELD, C. E., PERMAN, V., SAUTTER, J. H. & SCHULTZE, M. O. (1958). **Effect of trichloroethylene-extracted meat scrap on young cattle.** — *J. agric. food Chem.* **6,** 227-230. [Authors' summary modified.] **4089**

Four calves fed meat meal produced by azeotropic extraction-dehydration with trichlorethylene developed a moderate to severe thrombocytopenia and relative lymphocytosis and, in one instance, leucopenia. These effects are similar to those induced in young cattle by feeding certain specimens of trichlorethylene-extracted soya bean oil meal. [See *V.B.* **26,** 3610–3612.] Development of toxic properties in cattle feeds processed with trichlorethylene is therefore not restricted to soya beans.

ERNE, K. (1958). **The toxicological detection and determination of pentachlorophenol.** — *Acta pharm. tox., Kbh.* **14,** 158-172. **4090**

Pentachlorophenol is used as a molluscicide, wood preservative (*e.g.* "Cuprinol"), soil disinfectant, herbicide and fungicide. E. evolved a method suitable for determining the compound in suspected poisoning of livestock, based on ultra-violet spectrophotometry and paper chromatography.—R.M.

ABONYI, L., KOVÁCS, J. & MIKLOVICH, M. (1958). Szarvasmarhák karbamid-mérgezése. **[Carbamide poisoning in cattle.]** — *Mag. állator. Lapja* **13,** 131-134. [In Hungarian. Summaries in English and Russian.] **4091**

Carbamide was utilized by ruminants with 50% efficiency when it supplied one third of their protein requirement. However, doses higher than that (100–200 g. for cattle, 1,015 g. for sheep daily), not thoroughly mixed with the forage or without any previous appropriate habituation, caused poisoning manifested by dyspneoa,

moaning, sweating, salivation, swaying, collapse and tetanic spasms. Half to 1 gal. of 5% solution of acetic acid was an efficient antidote. The authors consider that carbamide can be used as a protein supplement, but only with great care.
—A. SEBESTENY.

DELAK, M. & MARŽAN, B. (1958). Otrovnost metaldehida za ptice. I. Klinički znaci, patološkoanatomski i patološkohistološki nalaz kod akutnog otrovanja kokoši i patke. **[Toxicity of metaldehyde for birds. I. Clinical picture, pathology, and histology in fowls and ducks.]** — *Vet. Arhiv* **28,** 95-105. [In Croat. Summaries in English and French.] **4092**

Toxic symptoms were observed in fowls following oral doses of 0·5 g./kg. body wt. of metaldehyde, as used for the destruction of snails, *e.g.* as a 5% mixture with bran, and in ducks given 0·3 g./kg. Doses of 2 g./kg. were lethal for fowls, and of 0·5 g./kg. for ducks. Clin. symptoms included excitability, tremor, spasms, dyspnoea and polypnoea. P.M. there was hyperaemia in liver and kidneys, degeneration of liver cells and of ganglion cells in the brain, hyperaemia and interstitial haemorrhages in the lungs.—E.G.

MADEJSKI, Z. (1958). Laboratoryjna metoda rozpoznawania zatruć dziurawcem zwyczajnym. (*Hypericum perforatum*). **[Laboratory diagnosis of *Hypericum perforatum* poisoning.]**—*Méd. vét., Varsovie* **14,** 220-224. [In Polish. Summaries in English and Russian.] **4093**

Pyridine extracts of the contents of the digestive tract of animals suspected of *H. perforatum* poisoning showed a characteristic light-red fluorescence under Wood's light. In live g.pigs and rabbits fed on fresh or dry *H. perforatum* the mucous membranes of the mouth, nasal cavity and conjunctivae showed a red fluorescence which could not be seen in animals fed on clover or lucerne.—M. GITTER.

ANON. (1958). **Facial eczema in New Zealand sheep.** — *Lancet* September 27th, 701-702. **4094**

A brief note states that workers at Ruakura report that the elusive toxic factor which causes facial eczema has been associated with a fungus, *Stemphylium botryosum*.

Facial eczema is a secondary photosensitization of sheep and cattle which occurs seasonably in New Zealand, particularly the North Island, sometimes as widespread outbreaks. It has been associated with the grazing of young rye-grass in autumn particularly after warm rains.

Much chemical work has been done in the past in attempts to identify the toxic agent.

It is now stated that cultures of *Stemphylium botryosum* (a widespread fungus parasitizing various pasture grasses and plants) have yielded an extract which reproduces facial eczema in guinea-pigs and lambs.

BRIDGES, R. G. (1958). **Fate of labelled insecticide residues in food products. VI. Retention of γ-benzene hexachloride by wheat and cheese. VII. The fate of γ-benzene hexachloride residues in flour during baking.**—*J. Sci. Fd Agric.* **9,** 431-439 & 439-448. [Author's absts. modified.] **4095**

The gamma-isomer of BHC labelled with radiocarbon was used to study the rate of loss of the insecticide from whole wheat and its distribution between the flour and bran fractions after milling. Loss from exposed wheat was rapid, but when it was stored in closed containers no loss was detected. After milling the wheat, 40-50% of the initial residue was still present in the 'fine' flour fraction while the residue in the bran was increased between two and four fold. Loss of the insecticide from Cheddar and Stilton cheeses was slow, about 40% of the weight applied remaining after 44 weeks. Penetration of the insecticide into both types of cheese was slow although appreciably more rapid in the Stilton cheese. Repeated applications caused a build-up of the insecticide in the outer few mm. of the cheese but had little effect on the amount penetrating more deeply.

The effect of heating at baking temperatures on the insecticide in wheat starch, gluten and milled wheat was studied. The amounts of radiocarbon activity retained by the starch and gluten after heating for 30 min. at 180° depend on the initial moisture content of the materials. The residue remaining after heating was 'locked up' in the desiccated starch granules and could not be extracted with acetone until the heated material was treated with water. The residue in the heated starch consisted mainly of unchanged gamma BHC, but that in the flour was shown to be mainly a mixture of tri-, di- and monochlorobenzenes. The toxicological significance of these breakdown products in bread is discussed.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

STERNBERG, S. S. & PHILIPS, F. S. (1958). **6-Aminonicotinamide and acute degenerative changes in the central nervous system.**—*Science* **127,** 644-646. **4096**

A single i/p injection of 8 mg./kg. was given to 47 male rats. Paralysis developed in the hind-quarters within 2 days. Histological examination of the c.n.s. revealed destruction of anterior horn cells in the spinal cord and of nuclei in the brain stem. Similar lesions were found in a cat given 30 mg./kg. i/v, and in 2 dogs given daily doses of 4 mg./kg. i/v or by mouth for 8 or 10 days. —M.G.G.

AUSTIN, W. C., POTTER, M. D. & TAYLOR, E. P. (1958). **Potential trypanocides. The action of polymethylene dihalides on 4-aminoquinaldine.**—*J. chem. Soc.* April. pp. 1489-1498. [Authors' summary.] **4097**

In an attempt to obtain a synthetic trypanocide, a series of polymethylene-bis-(4-aminoquinaldinium salts) was prepared. The decamethylene member was found to be a potent antibacterial agent, and is now commercially available. During the preparation of the hexamethylene homologue, the presence of a highly trypanocidal impurity was demonstrated. This was identified as 4-amino-1-(6-4-quinaldinyl aminohexyl) quinaldinium iodide hydriodide, and a practicable synthesis of it has been developed.

WORDEN, A. N. (1958). **The potentiation of liveweight gain in chicks by piperazine diacetate.**—*Lab. Pract.* **7,** 461. **4098**

It was observed that the birds receiving piperazine diacetate at 40 and 200 p.p.m. appeared to be growing better than the control chicks.

Further tests revealed that the drug did not have any significant effect upon body weight gain or food conversion from hatching to 28 days of age, but with older male chicks a beneficial result was obtained between 6 and 10 weeks of age.—R.M.

STURKIE, P. D., DURFEE, W. K. & SHEAHAN, M. (1958). **Effects of reserpine on the fowl.** —*Amer. J. Physiol.* **194,** 184-186. **4099**

In response to suggestions that reserpine medication might prevent deaths in fowls from fighting, overcrowding and excitement, the authors studied its effect on heart rate, blood pressure and body temp. The dosage required for a "tranquillizing" effect (0·1-0·2 mg./kg. intramuscularly) caused depression in body temp., heart rate and blood pressure, and diarrhoea, but did not affect egg laying.—R.M.

CRANSTON, E. M. (1958). **Effect of tranquilizers and other agents on sexual cycle of mice.**—*Proc. Soc. exp. Biol., N.Y.* **98,** 320-322. [Author's summary modified.] **4100**

Five tranquillizing drugs (reserpine, chlorpromazine, promethazine, phenaglycodol and meprobamate), two sedative drugs (phenobarbitone and ethyl alcohol), an adrenolytic agent (SKF 501) and an anticholinergic drug (atropine) all caused persistent dioestrus in mice when administered in food or water.

GIOLITTI, G. & CRAVERI, R. (1958). Un antibiotico attivo sui funghi e sugli insetti prodotto da uno *streptomyces*. **[An antibiotic (obtained from *Streptomyces*) with antifungal and insecticidal properties.]** — *Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 888-890. [Summaries in English and French.] **4101**

The Italian version of a paper published in English in another journal [see *V.B.* **27,** 3724]. —T.E.G.R.

CHEN, J. Y. P., BARD, J. W. & BELSITO, A. A. (1958). **In vivo penicillin inactivating effect and toxicity of penicillinase.** In *"Antibiotics Annual"* 1957-58. pp. 321-326. [New York: Medical Encyclopedia Inc.] **4102**

Inactivation of penicillin by penicillinase was studied in rabbits. The minimum dose required to inactivate 50,000 and 100,000 units of either benzylpenicillin or procaine penicillin was 2,000 and 5,000 units respectively. Penicillinase was not toxic for various lab. animals and would appear to be of value in treating allergic reactions caused by penicillin.—R.M.

WELCH, H., LEWIS, C. N., WEINSTEIN, H. I. & BOECKMAN, B. B. (1958). **Severe reactions to antibiotics. A nationwide survey.** In *"Antibiotics Annual"* 1957-58. pp. 296-309. [New York: Medical Encyclopedia Inc.] **4103**

A discussion on the incidence of shock, super-infection, skin reactions, blood dyscrasia, and angioneurotic oedema in human beings caused by antibiotics. Penicillin was responsible for most cases of shock (9% of which were fatal) and angioneurotic oedema with involvement of

the respiratory tract. Enterocolitis, mostly staphylococcal, was the commonest form of super-infection, and was most often associated with the use of tetracycline antibiotics, particularly in patients undergoing abdominal operations. Blood dyscrasia, commonly aplastic anaemia, was in most cases associated with the use of chloramphenicol.—R.M.

ANDERSON, K. & KEYNES, R. (1958). **Infected cork closures and the apparent survival of organisms in antiseptic solutions.**—*Brit. med. J.* August 2nd, 274-275. [Authors' summary modified.] **4104**

The apparent survival of a contaminating organism in an antiseptic solution was investigated. It was demonstrated that particles of contaminated cork fall into the solution as the cork is removed from the bottle. The apparent persistence of contaminants in a lethal solution is thereby explained. The experimental contamination of other antiseptic solutions was demonstrated, and the dangers of cork closures were once again emphasized.

See also absts. **3818** & **3891-3892** (mastitis); **3830** (disinfectants against TB.); **3860** (furazolidone in turkey salmonellosis); **3870** & **3872-3877** (brucellosis); **3901** (actinomycosis); **3903** (novobiocin and cycloserine against nocardia in vitro); **3907-3909** (infectious synovitis); **3910** (ethidium bromide in trypanosomiasis); **3914** (berenil); **3915** (trichomoniasis in bulls); **3916** (blackhead); **3921-3922** & **3925** (coccidiosis); **3928** (metachloridine); **3933** (piroplasmosis); **3937** (pyrimethamine in toxoplasmosis); **3965** (swine influenza); **3969** (resistance of feline pneumonitis virus to quinoxaline N-oxide); **3991, 4014, 4019, 4022-4023, 4025** & **4035-4036** (anthelmintics); **3994-3997, 4004** & **4008-4012** (insecticides); **4165** (British National Formulary).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

I. JOHNSON, H. D., CHU SHAN CHENG & RAGSDALE, A. C. (1958). **Environmental physiology and shelter engineering with special reference to domestic animals. XLVI. Comparison of the effect of environmental temperature on rabbits and cattle. Part 2. Influence of rising environmental temperature on the physiological reactions of rabbits and cattle.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 648 pp. 27. **4105**

II. BLINCOE, C. (1958). **Environmental physiology and shelter engineering with special reference to domestic animals. XLVII. The influence of constant ambient temperature on the thyroid activity and iodide metabolism of Shorthorn, Santa Gertrudis, and Brahman calves during growth.** — *Ibid.* No. 649 pp. 26. **4106**

III. STEWART, R. E. & SHANKLIN, M. D. (1958). **Environmental physiology and shelter engineering with special reference to domestic animals. XLVIII. Effects of growth and environmental temperature on surface temperatures of beef calves.**—*Ibid.* No. 656 pp. 23. [Authors' summaries modified.] **4107**

I. There are many similarities between cattle and rabbits in the physiological responses to rising environmental temperatures (48° to 110°F.) as evidenced by similarities in skin, hair, and air temperatures at 105°F. and with rectal temperature at 106° (indicating no heat loss by non-evaporative cooling); a rise in rectal temp. around 80° with associated declines in feed consumption, heat production, and thyroid activity; a remarkable similarity of the partition of surface and respiratory evaporative moisture loss. In both species there was a large rise in respiration rate around 75°. At 90° to 100° this increase is threefold.

Major differences of the rabbit and cow are as follows: The relative changes in evaporative cooling with rising environmental temperature—particularly between 50° and 80°; the absolute quantity of evaporative moisture loss; differences in the amount of hair covering the body; the pulse rates.

II. Data are presented on the influence of two ambient temperatures, 50° and 80°F., and growth, on the thyroid activity and extra-thyroidal iodine metabolism of heifers, and also on the effect of increasing ambient temp. at about 18 months of age.

In heifers reared at 50°F. thyroid secretory activity decreased between 2 and 7 months of age, irrespective of breed.

At 80°F. thyroid secretory activity of Shorthorn heifers was depressed by 45% and that of Santa Gertrudis only slightly; that of zebu heifers was unaffected.

Uptake of radio-iodine by the thyroid gland was constant up to about seven months of age and then decreased, becoming constant at about one year of age. The rate of iodine uptake decreased only after the thyroid secretory rate had become essentially constant.

Increasing the ambient temp. to 100°F. decreased thyroid secretory activity of Shorthorn heifers reared at 50° by 60%. Thyroid activity of the Shorthorn heifers reared at 80° was not depressed by 90°; this was probably due to their disproportionately large surface area. Thyroid secetory activity of Santa Gertrudis heifers reared in the 50° and 80°F. environments was depressed by 30% at 100°. Brahman heifers were unaffected by 90°.

III. Heifer calves of the Shorthorn, zebu, and Santa Gertrudis breeds were kept for a year at constant air temp. of 50° and 80°F. Hair and skin temperatures of body, dewlap, and navel flap (zebu only) were taken once a week.

At 80°F. increasing body weight was associated with decreasing skin temp. and increasing hair temp., except for Shorthorn body hair. The effect was probably due to decreasing hair length in zebu and Santa Gertrudis breeds.

At 50° the skin and hair temp. both deceased with increasing weight, except for the Shorthorn dewlap.

After completion of the constant-temperature (or growth) phase, both the 50° and 80° groups of calves were subjected to 65° to 110°F. for varying periods. The previous constant-temperature phase had little or no effect on subsequent measurements at other air temperatures. Surface temperatures were very similar to those measured previously in cows.

WALKER, C. A. (1958). **Studies in the environmental physiology of cattle in Northern Rhodesia. I. The relation between the changes in the haemoglobin index with age and the development of the heat toleration coefficient.** —*J. agric. Sci.* **51,** 119-122. [Author's summary modified.] **4108**

Changes in the haemoglobin index with age were studied in 4 indigenous African and 2 European breeds of cattle. The haemoglobin index was high and variable at birth and fell to an individiual more stable level at between 2 and 3 years of age. The haemoglobin levels in mature animals of the 4 African breeds were higher than the mean figures quoted for other tropical cattle. The haemoglobin levels in Friesians agreed with those quoted from temperate regions, but those in Jerseys were higher, agreeing most with Jamaican figures. A reason for this is advanced. Confirmation was given to the association of a high haemoglobin index with a high heat toleration coefficient. Changes in the haemoglobin index with age were associated with similar inverse changes in heat toleration, and the rapidity of the change of the one was closely correlated with the development of the other. It is concluded that the haemoglobin index alone is not reliable for forecasting the adaptability of calves to high temperatures.

HAMMEL, H. T., WYNDHAM, C. H. & HARDY, J. D. (1958). **Heat production and heat loss in the dog at 8-36° C. environmental temperature.** — *Amer. J. Physiol.* **194,** 99-108. **4109**

Three dogs acclimatized to 27°C. were placed in a calorimeter at temp. between 8° and 36°C. for 5 hours. The only physiological responses to low temp. were a moderate decrease in total heat content and an increase in heat production. In a hot environment heat loss from the respiratory tract greatly increased. It was concluded that the vasomotor response of the peripheral vascular system was primarily a mechanism for dissipating excess heat produced during exercise; it was of little importance as a heat conserving mechanism. Effective changes in the total insulation of the fur were not achieved by means of pilomotor activity.—R.M.

DE BELLA, G. (1958). **A comparative study of the concentrations of nonprotein, urea, and amino nitrogen in the maternal and fetal plasmas of sheep and goats.** — *Yale J. Biol. Med.* **30,** 368-373. [Author's summary modified.] **4110**

Comparisons were made of the concentrations of non-protein, urea, and amino acid nitrogen in the foetal and maternal plasma of sheep and goats killed at selected stages of gestation. In only one of 29 cases was the total non-protein nitrogen of the foetal plasma lower than that of the maternal; in all others it was higher by varying amounts of up to 37·8 mg.%. The urea nitrogen was slightly lower in the foetal than in the maternal plasma in 2 of 12 cases. In 10 it was higher in the foetus, though the differences were small. Amino acid nitrogen was higher in the foetal plasma in the 11 cases studied; the ratio of foetal to maternal concentrations ranged from 1·76 to 3·84.

JOYCE, C. R. B. & WEATHERALL, M. (1958). **Sodium and potassium movements in sheep erythrocytes of different cation composition.** —*J. Physiol.* **142,** 453-467. **4111**

The rates of exchange of radioactive sodium and radioactive potassium in incubated erythrocytes from Scottish Blackface sheep were measured.—R.M.

WINGET, C. M. & SMITH, A. H. (1958). **Changes in plasma calcium concentration during egg formation.** — *Poult. Sci.* **37,** 509-512. [Authors' summary modified.] **4112**

The concentration of total calcium in the plasma of laying hens fluctuated during the day, depending on the activity of the shell gland. The similarity of changes in concentration in hens with active and with inactive oviducts indicates that these changes may not be a direct result of shell mineralization. The decrease in circulating calcium during egg formation was mainly in the

bound form (non-diffusible). The ionic plasma calcium increased relative to total calcium while the shell gland was actively forming shell mineral.

FANTL, P. & MARR, A. G. (1958). **The coagulation of horse blood.**—*J. Physiol.* **142,** 197-207. [Authors' summary modified.] **4113**

Thromboplastin formation from plasma and serum components took place at the same rate in human and in horse blood. The activity of alpha-prothromboplastin (antihaemophilic factor), and beta-prothromboplastin (P.T.C., Christmas factor) and prothrombin in horse plasma was similar to that in human plasma. Horse as well as human brain extracts showed some degree of species specificity in one-stage prothrombin tests. Prothrombin accelerator (proaccelerin) of horse plasma was more active than that of human plasma. S.P.C.A. (factor VII) in horse serum was as active as that of human serum when acting in homologous systems. Thrombins isolated from mammalian plasmas gave shorter clotting times with human than with horse plasma.

KVASNITSKII, A. V. & KONYUKHOVA, V. A. (1958). **[Apparatus for quantitative determination and kymographic recording of salivary secretion in animals, particularly pigs.]**—*Sechenov J. Physiol.* **44,** 590-592. [In Russian.] **4114**

The method was suitable for a pig running loose in a pen. A cannula, presumably in the parotid duct, was connected by means of a long rubber tube, fastened to the back of the pig, to a burette filled with a solution of electrolytes. Electrodes at the lower end of the burette counted drops issuing from it and this was recorded on a smoked drum.—R.M.

BELL, F. R. (1958). **The mechanism of regurgitation during the process of rumination in the goat.**—*J. Physiol.* **142,** 503-515. [Author's summary modified.] **4115**

Intrapleural, intratracheal and intra-oesophageal pressures were measured in goats by capacitance manometers. Regurgitation is probably brought about by a differential pressure between the thoracic oesophagus and the reticulum, resulting from a special inspiratory effort coinciding with the phasic contraction of the reticulum. On opening of the oesophageal sphincter close to the cardia the abrupt pressure equilibration transfers liquid to the oesophagus. Part of the force generated in this way is expended as the slight but characteristic ballistic recoil which is a noticeable feature of the regurgitation phase of rumination.

AITKEN, R. N. C. (1958). **A histochemical study of the stomach and intestine of the chicken.** — *J. Anat., Lond.* **92,** 453-466. [Author's summary modified.] **4116**

The secreting cells of the submucosal glands of the proventriculus present features which suggest that they are concerned with HCl production. The secretion of the glands of the gizzard gives histochemical reactions which suggest that it is a form of hard keratin. There is a transitional zone with distinctive features situated between the gizzard and duodenum, which bears some functional resemblance to the mammalian pylorus. Argentaffin cells appear to be morphologically similar in small and large intestine. There does not appear to be any connexion between argentaffin cells and intestinal goblet cells.

FORD, E. J. H. (1958). **The content and distribution of alkaline phosphatase in the biliary tract of the sheep.**—*J. Anat., Lond.* **92,** 447-452. [Author's summary modified.] **4117**

The hepatic and extra-hepatic biliary tracts of ten sheep from 1½ to 35 weeks of age, of one foetus of about 16 weeks' gestation and of two g.pigs were examined for the presence of alkaline phosphatase.

Concentrations in the bile and serum are high in the young lamb and the occurrence of the enzyme in the tunica propria of the common, hepatic and cystic ducts, as demonstrated by a histochemical technique, is very variable. The tunicae propriae of the duct in the intestinal wall, of the gall-bladder and the bile canaliculi of the liver are positive at all ages, but in the foetus only the tunica propria of the gall-bladder is positive.

REŽEK, A. (1958). O pojavi slobodnog kolina i slobodnog fosfata u žuči. Encimatički dokaz nazočnosti glicerilfosforilkolina u svinjskoj žuči. **[Enzymic demonstration of glyceryl phosphoryl choline in pig bile.]**—*Vet. Arhiv.* **28,** 61-75. [In Croat. Summaries in English and German.] **4118**

Free inorganic phosphate was demonstrated in pig bile in amounts varying from 1·5–4·5 mg.%. Glyceryl phosphoryl choline, an independent bile component, was present in amounts of 3–47 mg.%. Increase in free choline was attributed to the action of an alkaline medium on glyceryl phosphoryl choline, which resulted in the setting free of choline. The remaining glyceryl phosphate was then hydrolysed into glyceryl and phosphate by the action of alkaline phosphatase.—E.G.

GERSHON-COHEN, J., CHERRY, N. H. & BOEHNKE, M. (1958). **Bone density studies with a gamma gage.**—*Radiation Res.* **8,** 509-515. **4119**

Gamma rays from radioactive iridium passed through the tissue to be measured into a scintillation counter connected to an electronic recording instrument. It was claimed that bone density could be determined with greater accuracy than by the use of X-rays and radiographs.—R.M.

WEIDMANN, S. M. & ROGERS, H. J. (1958). **Studies on the skeletal tissues. 5. The influence of age upon the degree of calcification and the incorporation of ^{32}P in bone.** — *Biochem. J.* **69,** 338-343. [Authors' summary modified.] **4120**

The degree of calcification (calcium/nitrogen ratio) of cortical bones in rabbits increases from about the fifth day of life and in the cat from about the ninth day. From the birth of kittens until they are 9 days old there is a continuous reduction in the degree of calcification.

The calcification of the cancellous bone in rabbits remains approximately constant during the whole of growth, whereas in cats this bone becomes less calcified during growth.

The amount of ^{32}P incorporated during the 4 hours following administration declines throughout the growth of rabbits in both cancellous and cortical bone. In cats there is a maximum incorporation in both types of bone at an age of about 14 days. This maximum is more marked in the cancellous bone.

In both cats and rabbits there is a very marked change during growth in the incorporation of P in the subperiosteal and endosteal layer of bone. The incorporation of P in the former layers declines throughout growth, whereas in the latter layers it reaches its maximum in the adult.

CLEGG, M. T., SANTOLUCITO, J. A., SMITH, J. D. & GANONG, W. F. (1958). **The effect of hypothalamic lesions on sexual behavior and estrous cycles in the ewe.**—*Endocrinology* **62,** 790-797. [Authors' abst. modified.] **4121**

The effect of hypothalamic lesions on oestrous behaviour, the pituitary content of gonadotrophin and the histological picture of the ovary, uterus, adrenals, and thyroid was investigated by the stereotaxic production of electrolytic lesions of the hypothalamus in 12 ewes. Destruction limited to the massa intermedia or optic chiasm (3 animals) had no effect on the oestrous cycle, but lesions in the ventral hypothalamus with a common area just above the median eminence anteriorly abolished heat (9 animals). There were no changes in the adrenals, and only slight changes in the thyroids of the animals with lesions. In two of the animals in which heat was abolished large corpora lutea were found P.M., and another had a mature follicle. On the other hand, one of two animals in which the cycle was abolished had a low pituitary content of both follicle stimulating hormone and luteinizing hormone; the other had a reduced pituitary content of LH: in both the uterus was histologically anoestrous and the pituitary small. The pituitary gonadotrophin content of the other 7 in which the oestrous cycles were abolished was not essentially different from that of animals in which the cycles continued. It is concluded that lesions in the anterior hypothalamus abolish heat in the oestrous ewe without necessarily changing the cyclical endocrine relationship between the pituitary and ovary.

FILOTTO, U. & VIGO, A. (1958). Ricerche morfologiche ed istochimiche sull'organo vomero-nasale in *Equus caballus* e *Bos taurus*. **[Morphology and histochemistry of the vomero-nasal organ in horse and ox.]**—*Atti Soc. ital. Sci. vet., Rimini - Ravenna* 1957. **11,** 771-774. [Summaries in English and French.] **4122**

A comparative study of the anatomy, histology and histochemistry of the vomero-nasal organ (organ of Jacobson) in the floor of the nasal cavity in the horse and in the ox. [The work of Minett, 1955, (*J. Anat.* **60,** 110) was not cited.]—T.E.G.R.

KRAUSS, H. (1957). Ein Beitrag zur funktionellen Anatomie des *Centrum tendineum* des Zwerchfells von Hund und Katze. **[Functional anatomy of the tendinous centre of the diaphragm of dog and cat.]** — *Inaug. Diss., Munich* [Reprint from *Morph. Jahrbuch.* **99,** 189-232 (1958).] **4123**

K. distinguished three systems of fibres (homolateral, contralateral and accessory) in the tendinous centre and discussed their function.—R.M.

GOLLER, H. (1957). Topographie und segmentaler Feinbau des Rückenmarkes des Schafes (Ovis aries). **[Topography and segmental structure of the spinal cord of sheep.]**—*Inaug. Diss., Munich* [Reprint from *Anat. Anz.* **105,** 26-88 (1958).] **4124**

Topography and histo-anatomy of the spinal cord of sheep is described in detail with frequent references to other animals.

Most of the data given are derived from

study of the spinal cords from 6 adult animals, a 3-month-old lamb and 3 fully developed foetuses.

A short chapter is devoted to embryonal development of the spinal cord, then the cord of the foetus is compared with that of the adult animal.

There are many figures relating to various measurements of the organ as a whole, its segments or its tissue components including numbers of neurones in different nuclei.

Five diagrams and four photographs illustrate the text.—S. TERLECKI.

I. OTTO, H. (1958). Über die histologischen Unterschiede und Erkennungsmerkmale der Epithelkörperchen von Hund und Pferd. **[Histological differences and identifying features of the parathyroid glands of horse and dog.]**—*Inaug. Diss., Munich* pp. 32. **4125**

II. KARL, H. (1958). Die histologischen Unterschiede und Erkennungsmerkmale der Epithelkörperchen von Rind, Ziege und Schaf. **[Histological differences and identifying features of the parathyroid glands of cattle, sheep and goats.]** — *Inaug. Diss., Munich* pp. 36. **4126**

I & II. Descriptions of species differences in the distribution of connective tissue (particularly collagen and argyrophile fibres) and blood vessels, and in the parenchymal cells.

—R.M.

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

UHERKO, J. (1958). Novšie antropozoonózy z hl'adiska veterinárnej prehliadky mäsa. **[Diseases of animals transmissible to man, and meat inspection.]**—*Vet. Čas.* **7,** 192-201. [In Slovak. Summaries in English, French, German and Russian.] **4127**

The meat inspection aspect was discussed of listeriosis, Q fever, leptospirosis, Aujeszky's disease, toxoplasmosis and tick-borne encephalitis in view of the increase in recent years in the incidence of some of these diseases in Slovakia.

—E.G.

MARSH, B. B. & THOMPSON, J. F. (1958). **Rigor mortis and thaw rigor in lamb.**—*J. Sci. Fd Agric.* **9,** 417-424. [Authors' summary modified.] **4128**

The onset of rigor mortis in the longissimus dorsi muscle of the lamb was studied with particular emphasis on the effect of temperature on its course. With the introduction of faster-freezing techniques in the frozen lamb industry, part of the carcass may be frozen before the onset of rigor mortis. It was shown, however, that the extreme shortening and loss of 'drip' characteristic of thaw rigor in isolated muscles will not occur if the muscles remain attached to the skeleton and thawing is not accelerated.

SHRIMPTON, D. H., BARNES, E. M. & MILLER, W. S. (1958). **The control of spoilage of uneviscerated poultry carcasses by treatment with antibiotics before slaughter.**—*J. Sci. Fd Agric.* **9,** 353-360. [Authors' abst. modified.] **4129**

An attempt was made to delay "greening" in stored uneviscerated poultry carcasses by feeding antibiotics before slaughter.

Supplementing the feed of broilers throughout life with procaine penicillin, alone or with chlortetracycline, was ineffective.

Supplements to the drinking water for up to 24 hours immediately before death prolonged storage life of the carcasses. The antibiotics used, in order of effectiveness, were: oxytetracycline, chlortetracycline, tetracycline, and bacitracin plus neomycin.

The main groups of organisms found in the caeca and duodenum after death were coliforms, faecal streptococci, lactobacilli and clostridia. Multiplication in both caeca and duodenum was retarded in the carcasses from birds treated with tetracycline compounds. It was not possible, however, to explain differences in the effectiveness of these antibiotics either in terms of the numbers of these groups of bacteria or in the metabolic activity of the contents of the caeca and the duodenum. The dangers of selective inhibition of organisms of faecal orgin without refrigeration are discussed.

KALOJANOFF, A. I. (1958). Organisation des Veterinärwesens in Bulgarien. **[Organization of the veterinary services in Bulgaria.]**—*Mh. VetMed.* **13,** 104-109. **4130**

The Bulgarian Veterinary Service was started after the Bulgarian-Turkish war in the eighties of last century. Development was slow owing to lack of veterinary surgeons, but more rapid progress was made after the Veterinary Faculty had been founded in Sofia in 1923 and 2 basic laws passed: one concerning the control of all food from animal sources and the other infectious diseases of livestock. Later the veterinary service was nationalized. Great progress was made in the fight against animal epidemics. From 1944, with the change to the

Communist system, 85% of all farms have been assembled in about 3,000 large co-operative organizations where more than 60% of all productive animals are kept in new buildings. Since these nationalized and co-operative estates now form the basis of the production of animal foodstuffs and animal raw products, the main task of the Veterinary Service is the organization of hygienic measures and their enforcement in practice.—E. S. FOUNTAIN.

See also absts. **3823-3824** (TB.); **3967** (Coxsackie virus pneumonia in man from pigs).

REPRODUCTION AND REPRODUCTIVE DISORDERS

BONADONNA, T. (1958). Nuovi mestrui diluitori per il materiale seminale bovino. **[A new diluent for bovine semen.]**—*Zootec. e Vet.* **13,** 182-186. **4131**

The "Illini variable temperature" (I.V.T.) diluent as evolved by Vandemark & Sharma [*V.B.* **28,** 1258] is described. B. carried out an *in vitro* storage trial against ordinary egg yolk–citrate diluent, involving semen from 8 bulls. From the second day, in I.V.T. medium without antibiotic, there was a notable drop in activity of spermatozoa; but in the presence of antibiotic, survival was equal to that in the control diluent up to the fourth day. Saprophytic bacteria were present after 24 hours in the absence of antibiotic, but no growth ever developed when this was added. However, of 30 normal cows inseminated with motile I.V.T.-diluted semen, none became pregnant.

—F. L. M. DAWSON.

HARTREE, E. F. & MANN, T. (1958). **Plasmalogen in ram semen and its role in sperm metabolism.**—*Biochem. J.* **69,** No. 4. p. 50P of Proceedings. **4132**

Recently it has been shown that there is little or no lecithin in ram spermatozoa and that the predominant intracellular phospholipid of ram semen is a choline-based plasmalogen [*V.B.* **28,** 1616]. The present study has been concerned with the content, properties and metabolic behaviour of the plasmalogen.—R.M.

WALES, R. G. & WHITE, I. G. (1958). **The effect of the ions of the alkali metals magnesium and calcium on dog spermatozoa.**—*J. Physiol.* **142,** 494-502. [Authors' summary modified.] **4133**

Potassium, magnesium and calcium chlorides each increased the viability of dog spermatozoa when added to a diluent composed of sodium phosphate buffer, NaCl and glucose.

Rubidium had an even greater stimulative effect than potassium; caesium and ammonium ions were ineffective and lithium was toxic. K. concentrations in excess of 0·20 M depressed motility, and diluents composed entirely of K salts were toxic. Neither Mg nor Ca antagonized the toxic action of K.

DAWSON, R. M. C. (1958). **Labelling of bull semen with phosphorus-32** *in vivo*.—*Nature, Lond.* **181,** 1014-1015. **4134**

A bull received i/v 14 ml. of saline containing 25 millicuries of labelled phosphate. Samples of semen were collected twice weekly for 10 weeks. In the seminal plasma the radioactivity of the glycerylphosphorylcholine was at its maximum 11-14 days after the injection, then it declined slowly. In the spermatozoa the phospholipid, residual phosphorus, and acid-soluble phosphorus reached their initial peaks of radioactivity after 21, 18, and 25 days respectively, and the main peak in the radioactivity of the deoxyribonucleic acid phosphorus occurred after 60 days. The time for the primary spermatocytes to be converted into spermatozoa was estimated to be 39 days.—M.G.G.

COOPER, D. M. & ROWELL, J. G. (1958). **Relations between fertility, embryonic survival and some semen characteristics in the chicken.**—*Poult. Sci.* **37,** 699-707. [Authors' summary modified.] **4135**

The following qualities were estimated for the semen of each of 30 cocks: fertility, embryonic survival, pH, resazurin reduction time, percentage of dead spermatozoa, density of all spermatozoa, density of live spermatozoa, and motility and volume of ejaculate. Fertility was correlated with percentage of dead spermatozoa, motility, reduction time and live density, but not with pH, density of all spermatozoa and volume of ejaculate. The quality of the semen, as measured by the percentage of dead spermatozoa, motility or reduction time, determined a cock's fertilizing ability more than the density of live spermatozoa. Reduction time, percentage of dead spermatozoa and motility were highly correlated.

There was some evidence to suggest that the survival of an embryo to hatching is influenced by the quality of the fertilizing spermatozoon.

NOYES, R. W., WALTON, A. & ADAMS, C. E. (1958). **Capacitation of rabbit spermatozoa.**—*Nature, Lond.* **181,** 1209-1210. **4136**

Suspensions of rabbit spermatozoa in normal

saline were incubated for 5–7 hours in various rabbit organs to determine the capacitative effect of the latter. Results showed that the uterus of the spayed subject, and the colon, were almost as efficient as the oestrous uterus, while the urinary bladder, seminal vesicle and anterior chamber of the eye were fully half as efficient. Enclosure in a dialysis bag prevented capacitation. The authors believe that longer exposure to the tissues in question would have produced more complete capacitation.

—F. L. M. Dawson.

Zachariae, E., Asboe-Hansen, G. & Boseila, A.-W. A. (1958). **Studies on the mechanism of ovulation. Migration of basophil leucocytes from blood to genital organs at ovulation in the rabbit.** — *Acta endocr., Copenhagen* **28,** 547-552. [In English.] **4137**

Ovulation in the rabbit is accompanied by migration of basophile leucocytes from the blood to the genital organs, primarily the ovaries, where the basophiles accumulate around ovulating follicles and migrate into the fresh corpus luteum, with loss of metachromatic granules. There is oedema at the site of accumulation of basophiles.—R.M.

Hilliger, H.-G. (1958). Zur Uteruskarunkel des Rindes und ihrer Vascularisation unter Berücksichtigung der zuführenden Uterusgefässe. [**The uterine cotyledons of the cow and their vascularization, with special reference to the afferent vessels from the uterus.**] —*Zbl. VetMed.* **5,** 51-82. [English, French and Spanish summaries.] **4138**

A detailed account, based on the study of plastic corrosion specimens.—R.M.

Shalash, M. R. (1958). **Reproduction in the buffalo-cow: pH of the vaginal secretions.**—*J. agric. Sci.* **51,** 70-71. [Author's summary modified.] **4139**

In 50 buffalo cows highly significant differences were found in the pH of the vaginal secretions during the stages of the sex cycle. The average was 7·3 during oestrus, 8·1 during dioestrus and 8·3 during pregnancy.

McLaren, A. & Michie, D. (1958). **An effect of the uterine environment upon skeletal morphology in the mouse.**—*Nature, Lond.* **181,** 1147-1148. **4140**

Cross-breeding and transference of fertilized eggs were carried out in two strains of mice, one strain having 5 lumbar vertebrae and the other 6. Examination of the female progeny revealed that vertebral type was influenced by the uterine environment and not by the egg cytoplasm.

—M.G.G.

Prachoff, R. (1958). Untersuchungen über die Erzeugung der Brunst und Beschleunigung der Ovulation der Stuten auf reflektorischem Wege. [**Induction of oestrus and stimulation of ovulation in mares.**] — *Wien. tierärztl. Mschr.* **45,** 114-125. [Summaries in English, French and Italian.] **4141**

The effect on the ovaries of applying specially designed electric heaters, warm liquid (in balloon), and also air douches to the vagina (for 25–30 min.) and of mechanical stimulation of the teats and clitoris was studied. Intensity of positive results varied much with season, a great increase occurring in April and May. 18 of 32 mares were brought on heat; liquid douches and the electric heater were almost uniformly successful where tried. In 33 of 50 oestrous mares, duration was claimed to be shortened and ovulation accelerated by the same stimuli. Here, by contrast with the anoestrous series, teat and clitoris stimulation were both occasionally effective. Some control of the effects was obtained by kymographs of the uterine contractions.—F. L. M. Dawson.

Payne, L. F. & McDaniel, G. R. (1958). **Fluorescent lights for turkey breeders.** — *Poult. Sci.* **37,** 722-726. [Authors' summary modified.] **4142**

While 15-watt flourescent tubes compared favourably with a 60-watt incandescent light to stimulate the onset of egg production in Broad Breasted Bronze turkeys in January, egg production was not high. When the flourescent light was supplemented with direct sunlight both fertility and hatchability were satisfactory. When used as the only source of illumination for 14 hours daily, a 15-watt fluorescent tube was inadequate as indicated by low production, fertility and hatchability. This amount of light appeared sufficient to maintain body weight and good health.

Yeates, N. T. M. (1958). **Foetal dwarfism in sheep—an effect of high atmospheric temperature during gestation.**—*J. agric. Sci.* **51,** 84-89. [Author's summary modified.] **4143**

The course of pregnancy was followed in 3 groups of Merino ewes. Seven ewes, maintained on a high level of nutrition, all lambed; the mean birth weight of the lambs was 8 lb. 6 oz. Six ewes, kept on a low level of nutrition, all lambed; the mean birth weight was 1 lb. 9 oz. lower. Seven ewes kept on a low level of nutri-

tion and subjected daily to temperatures of 112° F. dry bulb, 92°F. wet bulb, had only 4 lambs; the mean birth weight was 4 lb. 6 oz. less than in group 1, the skeletons of these lambs were much reduced in size. Poor nutrition alone, however, (group 2) caused little skeletal reduction. The mechanism of dwarfing is not clear. Measurement of fore-cannon bones and of liver weight indicated that it was not a nutritional effect.

SAVARD, K. & OTHERS. (1958). **The biosynthesis of estrone and progesterone in the pregnant mare.**—*J. biol. Chem.* **231,** 765-776. **4144**

Acetate labelled with radiocarbon was administered to pregnant mares, and its rate of incorporation into urinary oestrogens and metabolites of progesterone was studied.—R.M.

I. SHARAF, A. & HAFEZ, E. S. E. (1958). **Effect of the synthetic oestrogen stilboestrol on pregnancy in the rabbit.**—*Nature, Lond.* **181,** 1211. **4145**

II. SCHOFIELD, B. M. (1958). **Effect of the synthetic oestrogen stilboestrol on pregnancy in the rabbit.**—*Ibid.* **182,** 58-59. **4146**

I. Of 32 naturally-mated does, 16 were untreated controls and 16 were inoculated s/c with 1 mg. stilboestrol in oil either during the first 6 days after mating (12 does: group A) or 20 days after mating (4 does: group B). Pregnancy diagnosis was performed by laparotomy 7 days after mating in group A and in group B by digital palpation before inoculation, afterwards by laparotomy. Pregnancy was inhibited in group A and interrupted in group B with evidence of foetal absorption. The mode of action of stilboestrol was discussed.

II. Schofield criticized the work of Sharaf & Hafez on account of the very large dose of stilboestrol employed and the absence of histological study to determine the fate of ova recovered. Previous work on the same subject was discussed [*V.B.* **28,** 293].—R.M.

LAYNE, D. S., COMMON, R. H., MAW, W. A. & FRAPS, R. M. (1958). **Presence of oestrone, oestradiol and oestriol in extracts of ovaries of laying hens.**—*Nature, Lond.* **181,** 351-352. **4147**

The main oestrogens formed by the avian ovary are oestrone, oestradiol and oestriol, as indicated by chromatographic mobility, chemical reaction, and absorption of ultra-violet light. The identification of oestrone and of oestradiol was confirmed by radioautographic "fingerprinting" with reference steroids labelled with carbon-14. Neither oestradiol nor oestriol was found in any of the fractions of an extract from the blood of laying hens, but a compound resembling oestrone was found in the conjugated fraction of the extract.—M.G.G.

PUN, C. F. (1958). **The sex ratio in the progeny of oestrogen-treated parents in the Brown Leghorn.**—*Poult. Sci.* **37,** 307-311. [Author's summary modified.] **4148**

30-mg. stilboestrol tablets were implanted i/p into either or both parents. There was no evidence that the treatment of males affected the sex ratio of their progeny, whereas treated females had a preponderance of female offspring. The treatment had its greatest effect from 4 to 7 months after implantation. Later the sex ratio of the progeny reverted to normal. There was no evidence of a selective mortality of males during development or a difference in the fertility of eggs set. It seems that some of the viable female chicks were males that had changed sex, but this could not be proved by breeding from a sample of female chicks.

OSTERTAG, W. (1958). Hodenatrophie beim Hengst als Ursache der Zuchtuntauglichkeit. [**Testicular atrophy in stallions.**]—*Zuchthyg. FortpflStörung. u. Besamung.* **2,** 151-154. **4149**

Two light breed stallions and a heavy stallion were involved, the latter after a generalized febrile infection; the horses were maintained under widely differing conditions. All had undersized testicles, in one case accompanied by hydrocoele. Semen production varied from *nil* to 25% of low normal. In one light and the heavy horse, haemolytic streptococci were demonstrated in the semen. In the course of several months atrophy progressed further and the two light stallions were successfully put to farm work harnessed alongside mares.

—F. L. M. DAWSON.

RASBECH, N. O. (1958). **United Nations. Report to the Government of the Federation of Rhodesia and Nyasaland on infectious sterility in cattle.** pp. 5. Rome: Food and Agriculture Organization of United Nations. [FAO Report No. 861.] **4150**

The investigation was directed mainly towards the problem of epididymitis and vaginitis. The number of herds quarantined for this condition dropped during 1957 from 159 to 90. R. suggested that the disease might not be due to infection. There was some experimental evidence that scalding of the testicle by arsenical dips may play a part in causation, as may also the serum transudation over all parts of the body in both sexes, which is associated with

poor levels of nutrition. Gross phosphate deficiency may be common [but no quantitative work was attempted].—F. L. M. Dawson.

Shapiro, N. I. & Nujdin, N. I. (1958). **X-radiation and female fertility in the different species of mammals.**—*Radiation Res.* **9,** 180. [Authors' abst. modified.] **4151**

In the authors' previous investigations (*Sbornik Rabot Radiobiol. Akad. Nauk S.S.S.R., Inst. Genet. i. Inst. Biofiz.* 1955) female fertility of mice proved to be a very sensitive test for radiation damage; the oestrous cycle served as an adequate index for the quantitative estimation of radiation injury. The present work shows that the disturbance of oestrous cycle induced by whole-body irradiation is due to local damage of the gonads. The study of different species of mammals revealed great variation in radiosensitivity with regard to fertility. Thus, for instance, g.pig females were found extremely resistant compared with mice. Mammals can be arranged in the following diminishing succession with regard to radiosensitivity of their gonads: mouse, man, rat, g.pig. Disturbance of the oestrous cycle is caused by damage to the follicles in the ovary at the moment of irradiation and by failure of the germinative epithelium to form ova.

Segal, S. J. & Nelson, W. O. (1958). **An orally active compound with anti-fertility effects in rats.**—*Proc. Soc. exp. Biol., N.Y.* **98,** 431-436. [Authors' summary modified.] **4152**

When "MER-25" (a triphenyl ethanol derivative) is administered orally to female rats on the day of mating and continued throughout the normal period of oviducal passage of ova, implantation does not occur. Restricting the treatment period to only one day after coitus can also be effective in preventing nidation. Treated females enter a post-coital period of pseudo-pregnancy, then resume normal oestrous cycles. The antifertility effects appear to be exerted before the ova leave the oviducts. The compound does not act by preventing decidua development, nor by interfering with post-coital maintenance of luteal body function. Histological evidence indicates that ova of treated females undergo degeneration after extrusion of the second polar body.

See also absts. **3853** (Ps. pyocyanea from bull semen); **3856-3857** (coital transmission of avian salmonellosis); **3881** (leptospiral abortion in cows); **3922** (effect of nicarbazin in fowls); **3960** (balanoposthitis); **3962-3963** (ovine virus abortion); **3985** (abortion in mares caused by incompatibility of blood groups); **4011** (effect of insecticides on semen production in bulls); **4069** (posthitis in sheep); **4100** (effect of tranquillizers on sexual cycle in mice); **4121** (effect of hypothalamic lesions on oestrous cycle in ewes); **4163** (book, embryology); **4164** (book, embryology and pathology); **4167** (transactions of conference on gestation).

ZOOTECHNY

Kechawarz, M. N. (1957/58). La formation et l'évolution de la boucle chez le foetus et l'agneau Karakul. Les facteurs de qualité de la fourrure et leur importance pour la sélection. **[Formation and evolution of the curls in the wool coat of Karakul lamb foetuses.]** —*Ann. Inst. nat. Rech. agron., Paris* Ser. D **6,** 293-390; **7,** 25-68. **4153**

A detailed account, based on work done in Afghanistan, of pre-natal and post-natal development of the wool coat in Karakul lambs. There are 72 figures, many of which are photomicrographs.—R.M.

Freedman, D. G. (1958). **Constitutional and environmental interactions in rearing of four breeds of dogs.**—*Science* **127,** 585-586. **4154**

Eight litters of 4 puppies each were used. These comprised two litters each of Shetland sheep dogs, basenjis, wire-haired fox terriers, and beagles. After weaning at 3 weeks of age, 2 puppies of each litter were indulged in play and were never punished, and the other 2 were trained to obey commands. At 8 weeks of age each puppy was given this test daily for 8 days: each time it ate meat from a bowl in the centre of a room it was chastised; after 3 min. it was left alone in the room. Basenjis soon returned to the food, whereas Shetland sheep dogs tended not to, regardless of the method of rearing. On the other hand, in the beagles and wire-haired fox terriers, the indulged puppies took longer to return than the disciplined puppies. During training it had been observed that the beagles and wire-haired terriers were strongly attached to the handler, whereas the basenjis were aloof and the sheep dogs timid. It is concluded that the effectiveness of the punishment was enhanced by the interaction of the strong (constitutional) attraction and the indulgent treatment. Other tests, showing different results according to breed and method of rearing, were described.—M.G.G.

Ponomarenko, V. V. (1958). **[Differences in higher nervous activity between hens of different breeds.]**—*C.R. Acad. Sci. U.R.S.S.* **118,** 614-617. [In Russian.] **4155**

P. compared behaviour and conditioned re-

flexes in three types of hens: egg-laying type (White Russian breed), general purpose type (Plymouth Rock breed), and meat type (Australorp breed). For behaviour, the length of time spent on active movement in 24 hours and the time spent in a "hypnotic" state was determined, as well as amount of food ingested, body wt. and egg production. Conditioned reflexes related to feeding and response to red and green light were studied. In all tests the Australorp breed was considered to have a low or phlegmatic state of nervous activity, the Russian White was of a more lively disposition, while the Plymouth Rock was intermediate.—R.M.

TECHNIQUE AND APPARATUS

SHUGAR, D. & BARANOWSKA, J. (1958). **Quantitative Gram-staining with labelled iodine.** — *Nature, Lond.* **181,** 357-358. **4156**

A quantitative Gram-staining technique is described. It uses the Hucker modification, the sole difference being that the 'Lugol' solution contains about 25 μc. of iodine-131 per ml. and is applied by means of a 20-μl micropipette so as to cover the entire smear. The reaction is reversible. It is considered that in this staining reaction there is co-operative binding of dye and ionic iodine, but no oxidation of cellular material by the iodine, nor formation of iodotyrosine. —M.G.G.

BONNEL, P. H. & RABY, C. (1958). Le contrôle de la sterilité des produits biologiques au moyen de milieux semi-liquides permettant la culture simultanée des aérobies et des anaérobies. **[Control of sterility of biological products by the use of semi-liquid media permitting the simultaneous culture of aerobes and anaerobes.]**—*Proc. 3rd internat. Meet. biol. Standardization, Opatija* 1957. pp. 327-357. [In French.] **4157**

The growth of 63 organisms on 7 different media was compared. Two media were found suitable to be used alone for detecting bacterial contamination of vaccines and sera: the thioglycolate medium prescribed by the Pharmacopeia of the United States of America (15th revision, 1955) and the authors' own modification of sodium hydrosulphite medium.—R.M.

TOMING-REINTAM, V. M. (1958). **[Modified salivary cannulas for large animals.]** — *Sechenov J. Physiol.* **44,** 690-693. [In Russian.] **4158**

Two T-shaped cannulas were described, designed for prolonged insertion in the parotid duct of horses. Both permitted normal flow of saliva when the collecting arm of the cannula was closed.—R.M.

ANON. (1958). **The determination of the ABO and Rh (D) blood groups for transfusion.**— *Mem. med. Res. Coun., Lond.* No. 36. pp. 46. London: H.M. Stat. Off. 3s. 6d. **4159**

Although this memorandum deals only with human blood groups, it contains useful hints on the technique of blood group testing and on technical errors which may arise.—R.M.

LUGINBÜHL, H. (1958). Die farbphotographische Darstellung des Augenhintergrundes bei verschiedenen Haustieren. **[Colour photography of the retina of domestic animals.]**—*Schweiz. Arch. Tierheilk.* **100,** 187-199. [Summaries in English, French and Italian.] **4160**

For taking photographs of the retina in colour, L. constructed an apparatus with a very bright low-voltage light source. The light was reflected with a lens-mirror system into the atropine-treated eye of an anaesthetized animal. Despite the rather low sensitivity of colour films, this illumination was sufficiently bright to allow exposures of one 25th or one 50th of a sec., using a single-lens reflex camera.—E.G.

See also absts. **3815** (differentiation by culture of pathogenic and non-pathogenic staphylococci); **3816** (detection of phosphatase production by Staph. aureus); **3820** (mechanical milking and mastitis); **3833** (medium for M. johnei); **3927** (faecal concentration technique); **3936** (cultivation of toxoplasms in tissue culture); **3442** (growth of rabies virus in tissue culture); **3943** (diagnosis of rabies); **3948** (electron miscroscopy of fowl and pigeon pox virus).

BOOK REVIEWS

SEIDEN, R. & PFANDER, W. H. (1957). **The handbook of feedstuffs. Production, formulation, medication.** pp. xii + 591. New York: Springer Publishing Company, Inc. $8.00. **4161**

From the title of this handbook one would expect a detailed treatment, chapter by chapter, of methods for the production, formulation and medication of (compound) feedingstuffs. In fact, as stated within the book, this is "an encyclopaedic presentation of economic plants and other feedstuffs, plant diseases and insect enemies, herbicides, insecticides, drugs, with explanation of agricultural, botanical, chemical, nutritional and other scientific terms". The formulation and medication of feedingstuffs are

not dealt with as actual items, and information has to be sought under headings for the various drugs and types of feedingstuffs.

This is the first attempt to produce an encyclopaedia of this kind, and it is primarily intended for the farmer. The scope of the book is so large that descriptions have necessarily been made very brief, and this will limit the value of the book for specialists and advisory workers, who will probably have much of the information already available in their libraries.

Many of the terms used and defined are peculiar to North America and its farming practice, and would therefore have little meaning to the British farmer. The definition of "S. 100" for example, as "a variety of soybean", would merely be confusing. The "S" strains of grasses and clovers as we know them are not mentioned.

The basic idea of providing a book which will enable farmers, and others, to cut through the masses of technical information available today, is to be commended. While one cannot but admire the tremendous amount of work which must have been put into this volume, and while it may serve a very useful purpose in North America, the factors discussed above will necessarily limit its value in Gt. Britain.

—W. H. PARR.

SPRINGER, G. F. [Edited by.] (1957). **Polysaccharides in biology. Transactions of the Second Conference, April 25, 26, and 27, 1956, Princeton, N.J. [Sponsored by the Josiah Macy, Jr. Foundation.]** pp. 245. New York: Josiah Macy, Jr. Foundation. $5.00. **4162**

These transactions contain papers on sialic acid and related compounds, by F. Fremont-Smith; interaction of polysaccharides and viruses, by F. L. Horsfall; and pyrogens, by O. Westphal. As is usual with the Josiah Macy Foundation conferences, the text is interlaced with a free discussion by the 26 participants.

—R.M.

PATTEN, B. M. (1958). **Foundations of embryology.** pp. xvi+578. New York (London & Toronto): McGraw Hill Book Company, Inc. 74s. **4163**

Scientific and technical books which claim to introduce the reader to a subject frequently bear titles which are misleading in their simplicity. But the title of Professor Patten's latest book on embryology is a true description of the contents: the book really does deal with the foundations of embryology.

The anatomical approach of the author may not appeal strongly to those whose interests are centred in the biochemical, biophysical or genetical aspects of the subject. But the terms used can readily be understood by all whose basic training has included an anatomy course, and there is no need for them to learn yet another terminology. It may be argued that a knowledge of the structures involved should precede any study of their functions: this book is ample evidence to support such an argument. However, this is far from being a dissection manual, as considerable trouble has been taken to emphasize how structural arrangement has a functional significance, and the developmental processes are shown to be a succession of dynamic events.

The book is divided into three parts. The first deals with the early developmental processes common to vertebrate embryos. The reader is not expected to possess a wide or detailed knowledge of zoology, or to spend too long studying the development of the lower forms of animal life. Nevertheless sufficient comparisons are made and examples quoted to make the evolution of embryological processes clear. The production and maturation of the gametes, gastrulation and the establishment of the germ layers are well described. Even if one is reasonably familiar with these processes it is probable that these chapters will enable them to be visualized with a clearer perception.

The chick is our most available source of embryological material and its development can be easily studied. During the earlier stages of incubation most of the progressive changes are very similar to those occurring in mammalian embryos. For these reasons the second part of the book is devoted to a study of the development of the chick during the first four days of incubation. This period covers the formation of the body, the establishment of the embryonic membranes and the initiation of organ development and specialization. By easy stages the reader is led to the third and longest portion of the text where the full development of the organs of the mammalian embryo and their formation into the various systems are described. A chapter is devoted to each system, and the book concludes with a list of references. This wisely includes only publications which will be of use to the student commencing the study of embryology, and avoids the more advanced and technical works.

In his preface the author expresses pride in his illustrations. This pride is fully justified. One feature which distinguishes these illustrations from some on the same subject and makes them particularly useful is the avoidance of too many

abbreviations. There is no need for constant reference to a key to burden the memory, or to turn back to previous illustrations—a point which makes some books on embryology difficult and wearisome to read. The illustrations are extremely well correlated with the text. If the reader follows the author's instructions to study each illustration as it is referred to in the text, his task should be easy and pleasant.

"The Foundations of Embryology" is the fourth book Professor Patten has written on this subject. Whilst it can be recommended to anyone wishing to commence a study of embryology, it should be particularly welcomed by students and graduates of medicine and veterinary science who wish to take a further interest in this fascinating branch of science.—B. S. HANSON.

WILLIS, R. A. (1958). **The borderland of embryology and pathology.** pp. ix+627. London: Butterworth & Co. 90s. **4164**

The author writes as a pathologist who has always found a special appeal in the embryological aspects of pathology, and has a strong conviction that "pathologists need to know more embryology, and embryologists more pathology". Thus (p. 174) the author refers to "a widely held opinion . . . that there is little more to be learnt from gross malformations", an opinion which "has arisen largely as a revulsion from the indiscriminating hoarding of monsters in museum pots . . . The careful study of malformations has done much, and has much still to do, to clarify our understanding of normal development".

The scope of the book is clearly shown by the chapter headings: Experimental embryology; the first two months of human development (an exceptionally clear account); The structure and function of embryonic and foetal tissues (of special interest in pathology in connexion with teratomas, embryonic tumours and regenerating tissues); Malformations — their mode of genesis illustrated by their gross forms (including malformations of twins, triplets, etc., gross malformations of the neural tube and axial skeleton, head end, tail end, and body wall); Malformations of particular organs and tissues (arising from aplasia, agenesia, hypoplasia, failure of parts to coalesce and close, failure of parts to separate and canalize); The causes of malformations (environmental and genetic aspects); Developmental vestiges and their pathology (including the branchial and lateral cervical vestiges, remains of the urachus, the male mammary gland); Developmentally heterotopic tissues (supernumerary, transferred, dislocated, heteroplastic); Hamartomas and hamartomatous syndromes (including angiomas, neurofibromatosis, melanotic naevi); Inborn metabolic and allied disorders (*e.g.* errors of carbohydrate, lipid and amino-acid metabolism, errors of skeletogenesis, myopathies); The embryonic tumours and teratomas; Non-neoplastic diseases of the foetus (infections, foetal and maternal immunological incompatibility and so on); Regeneration and repair — resumed embryonic growth ("evidence for the truth of the idea . . . that reparative and regenerating tissues of all kinds display a structure and properties essentially similar to those of the corresponding immature tissues of the embryo and foetus"); Metaplasia (showing the range of metaplastic variability possible in each kind of adult tissue); The transplantation and culture of tissues. In an appendix are listed suggestions for further study and research that have arisen in each chapter.

The book is naturally addressed chiefly to medical pathologists, but will also be of interest to embryologists and zoologists in general, while veterinary pathologists and inquiring veterinary clinicians will find much of absorbing interest here; the author is well known for his interest in comparative pathology, and he has kept this in mind throughout the book. As would be expected from the author of "The Pathology of Tumours", the exposition is masterly, and a model of clarity, the illustrations (nearly all from the author's own material) vary in quality from good to excellent, the lists of references are wide-ranging and informative, and gaps in knowledge and profitable lines of research are clearly indicated. Any veterinary surgeon whose interest impinges in any way on the subject matter of this well-produced book, will find it not only profitable, but also fascinating, reading.

—E. COTCHIN.

ANON. (1958). **British national formulary 1957. First amendment 1958.** pp. 11. London: Pharmaceutical Press. 8d. **4165**

The purpose of this amendment to the *British National Formulary* of 1957 [*V.B.* **27,** 662] is to incorporate changes in the 1958 edition of the *British Pharmacopoeia.* The amendments are printed on gummed paper so that they can be cut out and stuck in the appropriate places in the Formulary.—R.M.

CHIODI, V. (1957). Storia della veterinaria. [**History of veterinary science.**] pp. 535. Milan: Farmitalia Servizio Veterinario. [In Italian.] **4166**

This most interesting, very well produced and profusely illustrated work of which 5,000

copies have been printed, was published by the Italian pharmaceutical establishment Farmitalia, and is not obtainable commercially. The history of the development of the veterinary art from the Pliocene to the present is narrated in a most pleasing, vivid style. Histories of veterinary teaching establishments in Europe and other parts are given in an appendix, followed by a bibliographical list and an index of names.

—E.G.

VILLEE, C. A. [Edited by.] (1958). **Gestation. Transactions of the Fourth Conference, March 5, 6 and 7, 1957, Princeton, N.J. [Sponsored by the Josiah Macy, Jr. Foundation.]** pp. 216. New York: Josiah Macy, Jr. Foundation. $4.50. **4167**

The four papers discussed at this conference were:—the physiology of foetal fluids, by J. Davies; the origin of amniotic fluid, by A. A. Plentl; the morphologic manifestations of uptake of materials by the yolk sac of the pregnant rabbit, by S. A. Luse; the development of fetal immunity, by F. W. Rogers Brambell. The transactions follow the same pattern as those of preceding conferences [*V.B.* **28,** 316].—R.M.

BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review.]

BRANDLEY, C. A. & JUNGHERR, E. L. (Edited by) (1958). **Advances in veterinary science. Vol. IV.** pp. xi+414. New York (& London): Academic Press Inc. $12.00. (86s. U.K.)

SCHERMER, S. (1958). Die Blutmorphologie der Laboratoriumstiere. **[Morphology of the blood of laboratory animals.]** pp. viii+186. Leipzig: Johann Ambrosius Barth. 2nd Edit. DM 30.60.

SYKES, G. (1958). **Disinfection and sterilization.** pp. xviii+396. London: E. & F. N. Spon Ltd. 75s.

Printed in Great Britain by CHARLES BURRELL & SON, Chertsey, Surrey.

AUTHOR INDEX

(The numbers refer to abstracts and not to pages. Where a page number appears after an author's name it refers to an entry in the list of books received)

Aamdal, J., 288, 1947, 3771, 3789.
Abbott, D. C., 3278.
Abbott, U. K., 1966, 2274.
Abdou, A. H., 819.
Abdussalam, M., 424, 1058.
Abelein, R., 732.
Aberg, B., 3652.
Abinanti, F. R., 455.
Abonyi, L., 4091.
Abraham, J., 3665.
Abrahams, A., 2281.
Abramov, I. V., 3915.
Ackerman, C. J., 1908.
Ackerman, W. W., 3979.
Acone, P., 3857.
Adams, C. E., 291, 2670, 4186.
Adams, D. J., 2895.
Adams, E. B., 3160.
Adams, E. W., 254.
Adams, F. W., 1860, 3329.
Adams, J. M., 444.
Adams, K. M., 458, 785.
Adams, W. R., 1076.
Adelaar, T. F., 893.
Adiwinata, R. T., 831, 2805.
Adjarian, R. 1539.
Adkins, T. R., Jr., 1472.
Adler, H. C., 2436.
Adler, H. E., 394, 723, 2085, 2086, 3179, 3540, 3906.
Adler, H. J., 218.
Adler, J. H., 546, 2115, 2607, 3349.
Aeschlimann, A., 4005.
Ageev, I. Y., 3964.
Agrimi, P., 690, 2263.
Ahmed, I. A., 1917.
Aines, P. D., 528.
Airapetyan, V. G., 372.
Aitken, J. N., 630.
Aitken, R. N. C., 4116.
Aivazyan, A. A., 4014.
Aizenshtadt, T. B., 1592.
Ajello, L., 2443.
Ajello, P., 179, 3439.
Ajmerito, G. C., 229.
Akaevskii, A. I., 1294.
Akopyan, V. D., 4014.
Akramovskii, M. N., 803.
Aksel, I. S., 2468.
Akulov, A. V., 2398.
Alberti, A., 3354.
Albertsen, B. E., 2070.
Albrecht, P., 1045.
Albright, J. L., 216.
Albu, T., 1430.
Alder, F. E., 2227.
Alder, H. L., 1890.
Aldrich, R. A., 641.
Aleandri, M., 692.
Aleraj, Z., 1083.
Aletina, M. B., 1554.
Alexxander, A. D., 2056.
Alexander, D. P., 1585.
Alexander, F., 2258, 2311.
Alexander, G., 3401.
Alexander, S., 2382.
Alicata, J. E., 1491, 2546.
Aliev, A. A., 2284.
Aliev, A. G., 2425.
Aliev, F. A., 3745.
Aliev, I. S., 3549.
Alim, K. A., 1917.
Allain, D., 173.
Allan, D., 487.
Allcroft, R., 522, 852, 1170, 2242.
Allden, W. G., 509.
Allen, A. M., 478, 3092.
Allen, C., 2633.
Allen, J. R., 535.
Allen, R., 1768.
Allen, R. S., 511, 1504.
Allen, T. E., 1951, 2989.
Allison, A. C., 913.
Allison, J. B., 193.
Alliston, C. W., 3437.
Alm, H., 1553.
Aloisi, M., 3689.
Alosi, C., 3826, 3939.
Alpers, H. S., 3258.
Alston, J. M., page 479.
Altara, I., 1988, page 224.
Altevogt, R., 2394.
Alton, G., 1706.
Alton, G. G., 3868.
Altschul, R., 2638.
Alves De Oliveira, J. J., 2745.
Alvord, E. C., Jr., 1649, page 109.
Alwar, V. S., 2209.
Amarasinge, A., 1706.
Ambrosino, C., 104.
Amitrov, V. K., 1680.
Ammerman, C. B., 1523.
D'Amore, A., 1765, 1766.
Amoroso, E. C., 2364.
Amosov, B. K., 2814.
Amsterdam, D., 1301.
Anantaraman, M., 829.
Ananthapadmanabhan, K. 653.
Anaya, J. S., 2402.
Anczykowksi, F., 1700, 2422.
Andersen, A. C., 3027, 4078, 4081.
Anderson, D. E., 497, 1496, 2219.
Anderson, D. W., 3403.
Anderson, E. C., 1896.
Anderson, G. W. 844, 2656, 2657.
Anderson, J. P., 3677.
Anderson, K., 4104.
Anderson, R. A., 509.
Anderson, R. C., 1569
Anderson, R K., 992.
Anderson, R. S., 3748.
Anderson, W., 1079.
Anderson, W. A., 7, 4039.
Andersson, B., 1599.
Andersson, P., 725.
Andleigh, H. S., 393.
Andral, A. M., 211.
Andral, L., 91, 498.
André, T., 244.
Andrewes, C. H., 1436, 1437, 2159, 2494.
Andrews, E. D., 3677.,
Andrews, F. N., 971, 1148, 3681.
Andrews, H. P., 3121.
Andriese, P. C., 2698.
Angeloff, S., 1400.
Angelovski, T., 1751.
Anisimov, I. N., 2899.
Annau, E., 463.
Annison, E. F., 3694.
Ansell, B. M., 531.
Antal, J., 1178.
Antaldi, G. V., 1840.
Anthony, A., 1928.
Anthony, D. W., 2929.
Anthony, W. V., 241, 3312.
Antliff, H. R., 619.
Anwar, M., 2817.
Aoyama, Y., 2166.
App, B. A., 243.
Appleman, R. D., 3400.
Appleton, G. S., 2062.
Appleton, J. M., 3426.
Arai, S., 2859.
Arakawa, S., 1054.
Arbib, G., 627.
Arbuckle, J., 3800.
D'Arces, P. J., 627.
Archer, R. K., 584, 596, 611, 3365.
Armitage, P., 95.
Armstrong, D. G., 1167, 2555.
Armstrong, J., 1661, 3541.
Armstrong, R. H., 1167.
Arnall, L., 2275.
Arnoff, H. 3221.
Arnold, P. T. D., 2941.
Aron, C., 2352.
Arora, R. B., 1582.
Arthaud, V. H., 1168.
Arundel, J. H., 1874.
Asboe-Hansen, G., 4137.
Ascarelli, I., 848.
Asch, L., 2352.
Aschbacher, P. W., 613.
Asdell, S. A., 2351.
Ashcroft, M. T., 728, 3542.
Ashdown, R. R., 1245.
Ashoub, M. R., 3022.
Ashton, G. C., 2277, 2313, 2896, 3984.
Askew, H. O., 2243.
Askonas, B. A., 2183.
Asmundson, V. S., 1966.
van Asperen, K., 2901.
Asso, J., 1993, 2826, 3213, 3562.
Atanasiu, P., 1065, 1418, 1419.
Athens, J. W., 2945.
Atherton, D. R., 4079.
Atherton, J. G., 1079.
Atkinson, J. C., 1581.
Atwood, M. B., 1730.
Audi, S., 1083.
Audran, R., 2517.
Auer, J., 3594.
Augustin, R., 2180, 2181.
Austin, W. C., 4007.
Austvoll, J., 226, 2269.
Austwick, P. K. C., 1022, 2445.
Autrey, K. M., 508.
Auty, J. H., 1130, 3518.
Avellini, G., 3090.
Averill, R. L. W., 2666, 3777.
Awad, F. I., 82, 3535, 3902.
Axelrad, A .A., 1864.
Aykan, T. B., 2468.
Azzone, G. F., 3689.

Babcock, M. J., 575
Babień, Z., 2622.
Bachmann, R., 280.
Bachrach, H. L., 408, 1413, 3209.
Backhausz, R., 3889.
von Backström, U., 2812, 3000.
Bacon, J. A., 1533.
Badawy, A. M., 2693.
Badwai, H. M., 3756.
Baechtel, W. R., 535.
Bagedda, G., 3670.
Baggenstoss, A. H., 1862.
Bagmet, A. G., 1389.
Bagratuni, L., 2382.
Bahar-Sefat, M., 2764.
Bailey, G. L., 2226.
Bailey, J. W., 1018, 1382.
Bailey, W. S., 4037.
Bailey, W. W., 867, 1184.
Bailie, M. J., 3025.
Bain, A. M., 626.
Bain R. V. S., 1681, 3494.
Bainbridge, M. N., 305.
Baisden, L. A., 6.
Bak, T., 2622.
Baker, B. L., 602.
Baker, B. R., 3385.
Baker, C. E., 1713.
Baker, D., 486, 3283.
Baker, E. W., 2531, page 224.
Baker, F. H., 847.
Baker, H., 2965.
Baker, J. A., 112, 2851.
Baker, L. A., 2552.
Baker, N., 3337, 3338.
Baker, N. F., 1136.
Baker, R. A., 1209.
Baker, R. C., 895.
Baker, R. O., 2312.
Baker, W. H., 504.
de Bakker, G., 1642.
Bakker, N., 1542.
Balasubramanian, A., 2833.
Balbierz, H., 4070.
Balch, C. C., 524, 1237.
Balch, R. K., 493.
Baldelli, B., 773, 3125, 3946.
Baldissera Nordio, C., 1840, 3684.
Bale, W. R., 2789.
Ball, C. O. T., 2293,
Ballarini, G., 2903.
Balozet, L., 3279.
Baluda, M. A., 439.
Bamberger, K., 1046, 3947.
Bandemer, S. L., 2557.
Bandur, B., 1689.
Bang, F. B., 137, 188, 3250, 3601.
Bangham, A. D., 912, 2645.
Bankowski, R. A., 126, 442, 1077, 1441, 3248.
Banks, A. W., 898, 1821.
Bannister, G. L., 3590.
Bannov, A. T., 1803.
Banta, J. E., 3582.
Baranowska, J., 4156.
Barber, M., 1994.
Barber, R. S., 2248, 2565.
Barbesier, J., 3122.
Barboriak, J. J., 3414.
Bard, J. W., 4102.
Bardawil, W. A., 3265.
Bárdoš, V., 3580, 3952.
Barger, E. H., 2711, page 418.
Barger, J. D., 3898.
Barker, C. A. V., 2335, 3590.
Barkham, P., 596.
Barner, R. D., 3059.
Barnes, C. M., 3348, 4075.
Barnes, E. G., 491.
Barnes, E. M., 923, 4129.
Barnes, J. M., 2220.
Barnes, L. L., 3673.
Barnett, A. J. G., 1846, 2569.
Barnett, B. D., 1907, 2295, 3189.
Barnett, S. F., 3201.
Barnicoat, C. R., 2570, 2635.
Barone, R., 1987.
Barr, F. S., 2716.
Barrera Pozas, J., 3128.
Barron, D. H., 2671.
Barry, V. C., 666.
Le Bars, H., 1289, 2601, 2602, page 56.
Barsukov, G. F., 1678.
Bartlett, S., 2244.
Bartmann, E., 2746.
Barton, B. P., 3631.
Bashkirtseva, E. V., 803.
Bassett, E. G., 2672.
Bastarrachea, F., 2393.
Bates, F. W., 2615.
Battelli, C., 31.
Battey, I., 1377.
Batts, A. A., 756.
Batty, I., 46.
Bauer, D. C., 3154.
Bauer, H., 3896.
Baum, G. L., 1733.
Baum, J., 1641.
Baumann, C. A., 2237, 2960.
Baxter, J. T., 487, 490. 1118.
Bayne, H. G., 989.
Beard, D., 2222.
Beard, J. W., 2222.
Bearns, R. E., 2023.
Bearup, A. J. 805.
Beattie, I. S., 2254 .
Beauregard, M., 1773.
Beaver, P. C., 3291.
Beck, A. B., 3676.
Beckett, E. B., 3371.
Becklund, W. W., 735.
Becze, J., 1270, 4011.
de Beer, E. J., 1489.
Beer, J., 765, 3233.
Beeson, P. B., 3854.
Beeson, W. M., 1527, 3675.
Begović, S., 1567 3725.
Behal, F. J., 3173.
Behrens, H., 527, 825, 2999.
Beinhauer, W., 2386.
Beiser, S. M., 1464.
Békési, I., 2794.
Bektemirov, T. A., 449.
Bélanger, L. F., 525, 2618.
Belcher, J., 3556.
Belding, R. C., 3860.
Belen'kii, N. G., 1960.
Belić, L., 119.
Belin, C., 3206.
Bell, A. H., 1981.
Bell, D., 269.
Bell D. S., 3438, 3786.
Bell, F. R., 1600, 2563, 4115.
Bell, J. F., 2776.
Bell, J. T., Jr. 3757.
Bell, M. C., 1512.

De Bella, G., 3414, 4110.
Bellamy, R. E., 2474, 2475, 2840.
Bellesia, L., 599.
Bellis, D. B., 1835.
Bello, J., 1829.
Belschner, H. G., 1983.
Belsito, A. A. 4102.
Belton, F. C., 656.
Belton, J. G., 666.
Bemrick, W. J., 1121, 3282.
Benacerraf, B., 684, 2728.
Benbrook, S. C., 120, 3702.
Benda, R., 3578, 3583.
Bendell, J. F., 943.
Bendixen, H. C., 856, 1197.
Bendixen, H. J., 501, 3302.
Benedek, T., 3534.
Benedict, A. A., 1448, 2505.
Benelli, S., 2049, 2760, 2763.
Benešová, D., 2739.
Beninati, F., 1924, 1926, 1927.
Beninato, L. P., 3181.
Benito, M., 2740.
Bennett, I. L., Jr., 2074.
Bennetts, H. W., 1217, 3660.
Benson, R. E., 329, 2594.
Benton, W. J., 3190.
Bentz, H., 3375.
Benzie, D., 1295, page 109.
Beppler, W. A., 2091.
Berard-Badier, M., 2986.
de Berardinis, E., 1586.
Berbinschi, C., 2126, 2268.
Bereznay, T., 2827.
Berg, J., 394, 2085, 3179.
Berg, L., 1649, page 109.
Berg, M., 2061.
Berg, O. A., 1757, 1316, 3043, 3044, 3045.
Bergmann, D. E., 701
Bergström, G., 3053.
Berlin, N. I., 558.
Berman, A., 1236.
Berman, E., 3160.
Bernacca, J. P., 3617.
Bernhard, W., 500, 2222.
Bernstein, A., 2409.
Berry, D. M., 566, 3004.
Bertaud, W. S., 376.
Berthelon, M., 2235.
Berthrong, M., 2396.
Bertrand, M., 874, 936.
Beseda, M., 1194.
Bessis, M., 1208.
Bester, J. F., 3395.
Bethard, W. F., 2943.
Bethcke, H. J., 370.
Beutler, E., 2584.
Bezelyuk, M. I., 88.
Bezuglov, T. M., 1827.
Bhattacharjee, M., 799.
Biagi, F., 2206.
Bialy, G., 616, 3768.
Bianca, W., 1238.
Biberstein, E. L., 3149.
Biche, Y., 3645.
Bickoff, E. M., 1577.
Bicks, V. A., 1673.
Bielesz, P., 428.
Biely, J., 2689.
Bierer, B. W., 1912.
Bieri, J. G., 537, 2600.
Biggers, J. D., 1978, 3022.
Biggs, P. M., 258, 588.
Bignell, J. T., 925.
Bignozzi, L., 2727.
Bilbey, D. L. J., 1230.
Bindrich, H., 107, 2831, 3247.
Bingham, E. L., 1732.
Binns, H. R., 926.
Biondi. E., 3826.
Bird, H. H., 2133.
Bird, H. R., 2295.
Bird, K. T., 2729.
Birkett, J. O., 1777.
Biró, J., 2152, 2154.
Birrell, J., 713.
Birzu, N., 3570.
Bishop, A., 3928.
Bishop, M., p. 479.
Bisping, W., 3505.
Bittner, J. J., 915.
Bizzell, W. E., 1116.
Björk, G., 2688.
Black, A. L., 270, 4058.
Black, D. A. K., 1510.
Black, D. J. G., 840.
Black, D. L., 2351.
Blackburn, P. S., 1249, 1872.
Blacklock, J. W. S., 8.
Blackshaw, A. W., 930, 931, 3038.
Blahd, W. H., 3337, 3338.
Blair, G. W. Scott., 271, 1619.
Blaizot, J., 211.
Blake, J. T., 511, 1504, 2937.
Blakely, R. M., 1152.
Blakemore, F., 532.
Blaker, R. G., 2395.
Blamberg, D. L., 2588.
Blanc, R. A., 85.
Blandin, J., 2286.
Blank, F., 1394.
Blaschko, H., 3410.
Di Blasi, S., 3117.
Blaxland, J. D., 565, 2747.
Blaxter, K. L., 205, 1534, 1834,, 1872, 2555, 2583.
Blažek, K., 1189, 1190.
Bletner, J. K., 2679.
Blincoe, C., 628, 2949, 4106.
Bliss, J. Q., 2184, 2897.
Blitek, D., 998.
Blobel, H., 51.
Block, W. D., 3720.
Blokhuis, J., 1946.
Blomqvist, K., 1142.
Blood. D, C., 1198, 1272.
Bloom, G., 3652.
Blosser, T. H., 216, 2326.
Blum, J., 3862.
Blunt, M. H., 2685.
Bo, W. J., 2358, 2359.
Boand, A. V., Jr., 2130.
Bobalik, G., 2800.
Bobrov, P. F., 2485.
Boch, J., 810, 2807.
Boda, J. M., 513, 1522, 3662.
Bodenweiser, L. E., 3794.
Boeckman, D. B., 4103.
Böhm, L. K., 3993.
Böhm, R., 969, page 55.
Boehme, D., 2730.
Boehnke, M., 4119.
Bömer, H., 885.
Börger, K., 3132.
Boerma, F. W., 459.
Börnfors, S., 3966.
Börnig, H., 2627.
Böszörményi, J., 3982.
Børre, K., 1341, 3120.
van Bogaert, L., 2986.
Bogart, A., 2361.
Bogdashev, N. F., 594.
Bogen, E., 333.
Boggs, D., 2590.
Boggs, D. E., 2115.
Bohl, E. H., 1398, 2426.
Bohosiewicz, M., 888.
De Bois, C. H. W., 3782.
Bojalil, L. F., 2393.
Bokkenheuser, V., 3099.
Boko, F., 160.
Bokori, J., 2055.
Bolin, F. M., 1274.
Bolin, V. S., 1435.
Bolton, E. T., 3602.
Bolton, W., 854.
Bonadonna, T., 2343, 3466, 4131, page 684.
Bonar, R. A., 2222.
Bond, H. E., 3749.
Bond, J. M., 1721.
Bond, T. E., 608, 3736.
Bond, V. P., 387, 2616.
Bondi, A., 236.
Bone, J. F., 2361.
Bonhorst, C. W., 2290.
Bonnaud, P., 2828.
Bonnel, P. H., 4157.
Booker, D. V., 2655.
Booker, E. M. K., 1845.
Bool, P. H., 3116.
Boone, I. U., 1894.
Boone, M. A., 3189.
Booth, A. N., 1577.
Bordjochki, A., 3197.
Borek, F., 1464.
Borgen, P. H. F., 1757, 1758.
Borghi, A., 681.
Borg-Petersen, C., 1372, 3152, 3881.
Borisovich, Y. F., 1309.
Borkowski, B., 71.
Born, J. L., 1002.
van den Born, J. M., 643.
Borneff, J., 1387.
Bordina, V. V., 813.
Boroff, D. A., 2777.
Borowski, W., 2332.
Borrel, A., 2740.
Boseila, A. W. A., 4137.
Bosgra, O., 2162.
Boski, A., 102, 1776.
Bost, J., 2286.
Bostick, W. L., 2927.
Bothwell, T. H., 3322.
Botti, L., 2218, 3700, 4013, 4034.
Bouché, J., 731.
Boucher, J. H., 2659.
Boucher, J. H., Jr., 1950.
Boucher, R. V., 3376.
Boucher, W. B., 902.
Bouckaert, J., 3353.
Bouckaert, J. H., 1631.
Boulanger, P., 2477, 2478, 3513.
Boulding, J. E. 1209.
Bouquet, Y., 1859.
Bourdin, P., 1065, 3591.
Bourne, G. H., 190, 3371.
Bouton, P. E., 1945.
Bouvier, G., 2262.
Bowen, N. E., 3202.
Bower, R. K., 3595.
Bowlby, G. M. S., 2696.
Bowman, G. W., 73.
Boyd, R. J., 2501.
Boyer, P. D., 1588.
Boyland, E., 2220.
Boyne, A. W., 745.
Braams, W. G., 135.
Bracewell, C. D., 1653, 2998.
Bracken, E. C., 108, 3956.
Braço Forte, M. C. Jr., 3170.
Braden, A. W .H., 3448.
Bradley, G. M., 352.
Bradley, R. E., 1115.
Braga, P. C., 2804.
Brambell, F. W. R., 3608.
Bramel, R. G., 1371.
Bramhall, J., 3245.
Brammell, W. S., 564.
von Brand, T., 786.
Brander, G. C., 1087, 1097.
Brandly, C. A., 748, 1767, 2379, page 750.
Brandt, M. C., 1137, 1495.
Bras, G., 566, 3004.
Bratanović, U. E., 1336.
Bratton, R. W., 2662, 3035.
Braude, R., 2248, 2565.
Braumhoyer, A. H., 3613.
Braun, W., 2755.
Braunsteiner, H., 3413.
Brausil, B., 4085.
Bray, R. S., page 622.
Brebbia, A., 3272.
Brecher, G., 2992.
Breese, S. S., Jr., 408, 3209.
Breitenfeld, P. M., 1438.
Brennan, D. M., 586.
Bressou, C., 2325.
Bretey, J., 1228.
Brethour, J. R., 3672, 3674.
Breton-Gorius, J., 1208.
Breuer, D., 1992, page 224.
Bridges, C. H., 2990.
Bridges, J. F., 1692.
Bridges, R. G., 4095.
Briggs, C. A .E., 2088, 2239.
Briggs, G. M., 537, 2600.
Briggs, J. E., 1490.
Briggs, P. K., 842, 1162, 1163.
Brill, J., 2043, 2412, 3492.
Brinkman, D. C., 624.
Brion, A., 133, 1144, 3539.
Brion, A. J., 3703.
Broadfoot, D. I., 141.
Broberg, G., 725, 1843, 3311.
Brochwitz, H., 2815.
Brody, H., 2936.
Brody, S., 589, 590.
Brooijmans, A. W. M., 2971.
Brooks, C. C., 3306.
Brooks, F. N., 2297.
Brooks, M. E., 377, 1378.
Brooksbank, N. G., 1965.
Brooksby, J. B., 2123.
Broom, J. C., p. 479.
Broome, A. E., 2282.
Broome, A. J. W., 1969.
Bro-Rasmussen, F., 3690.
Broster, W. H., 2226.
Brotherston, J. G., 2479.
Brown, B. B., 2244.
Brown, D. G., 3368.
Brown, E. R., 3479.
Brown, F., 2464.
Brown, L. B., 2524
Brown, L. D., 847.
Brown L. R., 3309.
Brown, L. V., 3222.
Brown, P. H., 240.
Brown, R., Jr., 1717.
Brown, R. A., 2133.
Brown, R. D., 1062, 3957, 3958.
Brown, R. E., 397, 519, 544.
Brown, R. G., 113.
Brown, R. W., 1999, 3080.
Brown, T. H., 165, 1825, 2140.
Brown, W. O., 859.
Brown, W. W., 1425.
Browne, L. B., 3612.
Brownlee, A., 637.
Brownlie, W. M., 2093.
Brubacher, G. B., 270.
Bruce, W. N., 1801, 3998.
Bruckner, J. H., 895.
Brueckner, A. L., 2465.
Brüggemann, J., 1961.
Brumby, P. J., 2695.
Brune, H., 196.
Bruner, D. W., 960, 1695.
Brunner, H., 296.
Brunson, J., 2401.
Brunstad, G. E., 3783.
Brush, M. K., 193.
Bryans, J. T., 772.
Bryant, F. J., 3334, 4082.
Bryant, J., 512.
Bryner, J. H., 2066.
Bube, F. W., 3545.
Bubień, Z., 887.
Buchanan, G., 3099.
Buchanan, M. L., 1274.
Buck, G., 3591.
Buck, W. B., 581.
Buddle, M. B., 371, 3148.
Bud-Husaim, P., 2658.
Budovich, T., 1587.
Bürki, F., 39, 1353, 2753.
Bugeac, T., 2268.
Bugyaki, L., 2150, 3961.
Buhler, V. B., 2078.
Buistrov, B. N., 1915.
Buljević, S. M., 817.
Bull, H. McM., 1904.
Bull, L. B., 2294.
Bulle, P. H., 900.
Bullen, J. J., 45, 46, 1377.
Buling, E., 1415.
Bullough, W. S., 2220.
Burdoff, R., 1699, 3512.
Van Buren, J. M., 2791
Burge, G. J., 590.
Burgisser, H., 3227, 503, 2262.
Burke, D. C., 448, 2131.
Burke, J. F., 3893.
Burke, W. T., 2553.
Burley, R. W., 1525.
Burmester, B. R., 186, 187, 1145, 1501, 2223, 2932.
Burn, G. P., 913.
Burn, J. H., 248.
Burnet, F. M., 1420.
Burnet, MacF., 183.
Burnett, F. M., 1795.
Burns, E. C., 1573, 3620.
Burns, K. F., 2132.
Burnside, J. E., 1780.
Burnstein, T., 1371, 3250.
Burr, W. E., 1346.
Burroughs, W., 1640.
Burrows, D., 499.
Burrows, R. B., 2915, 4022.
Burstone, M. S., 1976.
Burtner, R. H., Jr., 3917.
Burton, H. W., 3687.
Bushlapd, R. C., 153, 242.
Bussel, B. W., 3664.
Bussell, R. H., 2869.
Bustad, L. K., 176, 2991, 3348, 4075.
Buthala, D. A., 2190.

Butler, E. J., 552.
Butler, G. W., 1182.
Butterworth, E. M., 270.
Buttiaux, R., 2089.
Butz, H., 3056.
Bystrický, V., 1019, 3948.
Bywater, H. E., 1117.

Cabasso, V., J., 113, 129.
Cadillac, G., 820.
Calaprice, A., 3971, 3822, 3856, 3857.
Calcinardi, C., 2758.
Caldas, A. D., 1697.
Calet, C., 2631.
Calder, A. F. C., 1154, 1514, 1526.
Calhoun, C. L., 334.
Calhoun, M. L., 265, 1746.
Čalić, Z., 984, 1674.
Callahan, J. F., 1919.
Callenbach, E. W., 3376.
Callender, M. E., 1137, 1495.
Callis, J. J., 408, 1413.
Camand, R., 771, 1764.
Cambir, S., 2047.
Cameron, G. R., 3464, page 224.
Cameron, H. S., 517, 991, 2754, 3140.
Camp, L. B., 2444.
Campano, 3230.
Campbell, D. H., 2888, 3259, 3261.
Campbell, D. J., 488, 2194.
Campbell, E. A., 561.
Campbell, J. G., 3303.
Campbell, R. C., 1638, 2340.
Campbell, R. L., 2342.
Campbell, R. M., 2693.
Campbell, R. S. F., 768, 1756.
Campbell, W. R., 1858.
Cannon, D. J., 3061.
Cantrell, W., 1403, 2456.
Caparo, A. C., 3299.
Capell, G. H., 306.
Caporale, G., 863.
Card, L. E., 2711, page 418.
Cardassis, J., 221, 3933.
Cardeilhac, P. T., 2056, 2057.
Carević, O., 787, 788.
Carlisle, H. N., 3900.
Carll, W. T., 1730, 2928.
Carlotto, F., 672, 3598.
Carlson, R. G., 1427.
Carman, P. E., 2716.
Carmon, J. L., 3644.
Do Carmo Sousa, L., 3170.
Carnaghan, R. B. A., 565, 857, 1201.
Carneiro Viana, J. A., 1530.
Carpenter, C. M., 2420.
Carpenter, K. J., 2934.
Carr, J. G., 3791.
Carr, J. W., 2057.
Carrick, C. W., 3681.
Carrick, R., 1255.
Carroll, F. D., 629.
Carroll, K. K., 1849.
Carter, B. G., 3983.
Carter, G. R., 345, 2972, 3849.
Carter, P. D., 2623.
Carter, H. B., 3404.
Carter, J. S., 2073.
Carter, P. D., 2623.
Carter, R. H., 243, 3387.
Cartwright, G. E., 2945.
Caruthers, B., 2066.
Carver, R. K., 3557.
Casarett, G. W., 4080.
Casarosa, L., 1886.
Case, A. A., 1220.
Cassard, H., 2886.
Castagnoli, B., 1765, 1766.
Castella Beltrán, E., 3381.
Castellani, A., 1012.
Castillo, A. M., 3193.
Castle, E. J., 1872.
Castleman, B., 200.
Castro, E. R., 398.
Castrucci, G., 3945.
Catellani, G., 249, 2221, 2271.
Catron, D. V., 2312, 2313.
Cauthen, G. E., 2542.
Cawley, A. J., 1636.
Ceccarelli, A., 3216.
Cedrangolo, F., 2306.
Cegielka, M., 3039.
Cello, R. M., 4041.
Černá, J., 1546.
Černý, L., 37, 976.
Černý, V., 1034, 3932.
Chabaud, A. G., 795.
Chadli, A., 3569.
Chadwick, L. E., 1098.
Chalmers, J. G., 4086.
Chambard, P., 151.
Chamberlain, A. C., 3334, 4082.
Chamberlain, A. G., 3726.
Chamberlain, R. W., 99, 100, 416.
Chamberlin, R. H., 2751.
Chambers, D., 497, 1496, 2219, 2333, 2362.
Champigny, O., 3665.
Chance, H. L., 358.
Chandler, A. C., 3911.
Chandler, R. L., 337, 2014, 2803, 3606.
Chandrasekariah, P., 677.
Chadrasekharan, K. P., 3091.
Chang, M. C., 3772.
Chang,, P. W., 1445.
Chang, T. S., 782, 3262.
Chang-Ling Lee, 1809.
Chapman, G. B., 1311.
Chapman, R. E., 1233.
Chappaz, G., 2708, page 109.
Chaproniere, D. M., 1436, 1437, 2159, 2167, 2494.
Charles, G., 985.
Charles, R. T., 3178.
Chassels, J. B., 247.
Chatterjee, D. P., 2387.
Chaves, A. D., 1320.
Cheatham, W. J., 1779.
Cheli, R., 249.
Chen, J. Y. P., 4102.
Chen, K. K., 574, 1568, 1569.
Cheney, G. L., 1782.
Cheremnuikh, L. P., 1603.
Chernin, E., 1479.
Chernuisheva, M. I., 2417.
Chernyavskii, V. P., 754.
Cherry, N. H., 4119.
Cherry, S. H., 559.
Chevé, J., 711, 1380.
Chevrier, L., 413.
Cheyroux, M., 3968.
Chien, S., 559.
Chikatsune, M., 115.
Childs, W. A., 2189.
Chin, P. H., 387, 2616.
De China, T., 3822.
Chiodi, V., 4166, page 418.
Chipman, P. B., 1484.
Chivers, W. H., 1426, 1884, 2850.
Chládecký, F., 1090.
Chodnik, K. S., 828.
Choh Hao Li, 1920.
Chomiak, T. W., 1789.
Chow, B., 2603.
Chow, T. L., 1425, 1767.
Chowdhury, A. K., 2311.
Christensen, J. F., 1754, 2813.
Christensen, N. O., 2593, 3341, 3686.
Christensen, P. M., 2173.
Christian, K. R., 189, 2232.
Christofinis, G. J., 3977.
Christoph, H. J., 2987.
Chu, H. P., 2087.
Chubabriya, I. T., 1481.
Chubb, L. G., 838, 3127.
Church, L. E., 905.
Chu Shan Cheng, 3396, 3399, 3735, 4105.
Chute, H. L., 3174.
Chvátal, O., 1783.
Ciaccio, G., 747.
Ciak, J., 2408.
Cichetti, R., 3159.
Cieleszky, V., 2750.
Cilli, V., 3946.
Ciminera, J. L., 2185.
Cinader, B., 2186, 3983.
Ciolca, A., 2094.
Ciordia, H., 1114, 1116.
Ćirić, V., 1433.
Ćirstet, I., 2126.
Citron, K. M., 2397.
Claflin, R. M., 3229, 3959.
Claringbold, P. J., 458, 467, 1266, 2360, 3785.
Clark, C. H., 1887, 2610.
Clark, D. S., 1370.
Clark, G. M., 2461.
Clark, G. W., 3921.
Clark, I., 4055.
Clark, M. K., 3184.
Clark, S. T., 862, 3362, 3363.
Clarke, E. A., 3658.
Clarke, E. W., 1615.
Clarke, P. M., 2248.
Clarke, W. J., 4075.
Clarkson, M. J., 2457, 3546.
Clarkson, T. W., 3717.
Clay, T., 1288.
Clegg, M. T., 629, 4121.
Clemmer, D. L., 1692.
Cleverley, B., 3423.
Clewe, T. H., 2349.
Clifford, P. A., 274.
Clifton, C. E., 311, page 479.
Closs, K., 1851.
Cluff, L. E., 2074.
Cmarik, G. F., 1799.
Coates, M. E., 2239.
Coates, W. S., 791.
Cobbett, N. G., 2197.
Cochrane, R. L., 942.
Cock, A. G., 3264.
Cocking, E. C., 3495.
Coghlan, J. D., 3852.
Cohen, D., 3951.
Cohen, P., 298.
Colas-Belcour, J., 3257.
Colbert, B., 3512.
Colby, R. W., 1802.
Cole, G. C., 3177.
Cole, H. H., 513, 939.
Cole, R. D., 1920.
Cole, R. K., 1500.
Coleman, N., 1759.
Coles, R., 2556.
Coletsos, P.-J., 1228.
Colglazier, M. L., 2214.
Colichón, J., 1348.
Collard, P., 1338, 1339, 1340.
Collenot, A., 1570.
Collery, L., 560, 2249, 2641.
Colless, D. H., 3581.
Colombo, S., 1497.
Colosi, A., 3528.
Colter, J. S., 2133.
Colvin, H. W., Jr., 513.
Coman, I., 2126.
Comar, C. L., 201, 1203, 2618, 2677.
Comben, B. M., 3572.
Combs, G. E., 2956.
Combs, G. E., Jr., 3314.
Combs, G. F., 2588.
Comline, R. S., 1598, 3759.
Commissiong, K., 1175.
Common, R. H., 4147.
Conalty, M. L., 666.
Conard, R. A., 2992.
Conchie, J., 1260.
Congdon, C. C., 1466.
Conley, C., 2955.
Conley, J., 4080.
Conn, E., 1660.
Connell, R., 2038.
Conrad, R. D., 3187, 3301, 3497.
Constantinescu, C., 1326, 1327.
Constantinesco, N., 3570.
Contini, A., 1080, 3890, 3905.
Conze, H., 294.
Cook, A. R., 1714.
Cook, C. W., 1150, 2937.
Cook, F. D., 1152.
Cook, I., 1422.
Cook, J. W., 1477, 1910, 2298.
Cook, M. K., 3936, 3937.
Cook, T. M., 3168.
Coombs, R. R. A., 465, 2514.
Cooper, D. M., 932, 1406, 4135.
Cooper, M. S., 378.
Cooper, P. D., 749.
Cooper, R. E., 3142.
Copp, F. C., 2915.
Cordray, D. R., 1743, 1749.
Cordy, D. R., 732, 1830, 1869, 2085.
Cormus, D., 1310.
Cornell, R. G., 3157.
Corner, A. H., 2038.
Cornish, H. H., 3720.
Coroş, I., 2094.
Corrado, A., 3013.
Corrias, A., 3198.
Corsalini, T., 702.
Corsico, G., 3530.
Corvazier, R., 3968.
Cossel, L., 2101.
Cotchin, E., 1828, 3293.
Cottereau, P., 876.
Couch, J. R., 858, 2587, 2599, 2613, 2951, 3003, 3176.
Coudert, J., 3292.
Coulson, C. B., 195.
Councill, F., 4051.
Coup, M. R., 1213.
Coussens, R., 1591.
Coval, M., 1920.
Cover, M. S., 1227, 3190.
Cowan, A. B., 1412.
Cowan, S. T., 648, 3465, page 348.
Cowie, A. T., 3026.
Cowie, R. S., 625.
Cowlishaw, S. J., 1837.
Cox, D. H., 1900, 3385.
Cox, G. E., 2006.
Cox, H. R., 113, 2224, 2931.
Craddock, C. G., Jr., 256.
Craft, C. E., 468.
Craig, F. N., 3060.
Craig, J. M., 2957.
Crain, R. C., 3300.
Crandell, R. A., 1779, 2865.
Cranston, E. M., 4100.
Craplet, C., 1990, page 109.
Crass, G., 3002.
Craveri, R., 4101.
Crawford, J. D., 200.
Crawford, J. G., 2838.
Crawford, R. D., 736.
Crawford, W. P., 3176.
Crawley, J. F., 3489.
Crawley, W., 1796.
Creech, B. G., 858, 2599, 2951.
Creed, R. F. S., 3713.
Creek, R. D., 3681.
Cremonesi, G., 3159.
Cresswell, E., 600, 1276, 2700, 3659.
Crichton, J. A., 630, 631.
Crick, J., 2464.
Cristescu, M., 2268.
Cristescu, P., 1663.
Crofton, H. D., 2212.
Cromartie, W. J., 1302.
Crombach, J. J. M. L., 3765.
Cronin, M. T. I., 344.
Cronkite, E. P., 2992.
Crookshank, H. R., 2561.
Cross, B. A., 2639, 2673, 3042, 3742, 3787.
Crossmann, M. S., 1959.
Crowle, A. J., 3605.
Crowson, C. N., 2291.
Cruickshank, C. N. D., 2220.
Cruickshank, J. G., 2564.
Crumpton, M. J., 3111.
Cseh, S., 1270, 1956.
Csillik, B., 4087.
Cuadra, M., 3367.
Cuboni, E., 1718.
Cuckler, A. C., 402, 2455.
Cuculiu, N. L., 2467.
Cumming, R. B., 1055.
Cummings, J. N., 3333.
Cunha, R. G., 1762.
Cunha, T. J., 315.
Cunningham, I. J., 1856, 2234, 2241, 2997.
Cunningham, M. P., 375.
Cunningham, N. F., 2962.
Cursan, P., 3110.
Cury, R., 35.
Cutchins, E. C., 1455.
Cuthbertson, D. P., 2693.
Cutkomp, L. K., 2526.
Cyrus, B., 43.
Czernicki, B., 2319.

Dacres, W. G., 3514.
Dafaalla, E. N., 60, 61, 3175.
Dafni, I., 3507.
Dahm, P. A., 1573, 3620.
Daigeler, A., 359.

Dale, E., Jr., 1798.
Dale, H. E., 367, 590, 3411, 3735.
Dalgaard-Mikkelsen, S., 1580.
Dalling, T., 1062.
Dalmat, H. T., 2868, 3070.
Damerow, R., 15.
Dammers, J., 3444.
Damodaran, S., 834.
Daneš, L., 3583.
Daniel, P. M., 3421.
Danielescu, G., 1736.
Daniels, J. B., 2839.
Danilova, V. M., 3552.
Dan'kov, I. A., 1575.
Dannacher, G., 2462.
Dannenberg, A. M., Jr., 2016.
Danon, M., 1273.
Darby, N. B., 2698.
Dardiri, A. H., 1445.
Darlington, F. G., 247.
Darlow, H. M., 2789.
Darraspen, E., 2986.
Darroch, R. A., 215.
Darski, J., 827.
Das, M. S., 649, 3850.
Das, P. K., 1582.
Datt, N. S., 2470.
Daubney, R., 98.
Davey, T. H., 2261.
Davich, T. B., 3387.
Davidson, J. A., 2557.
Davidson, M., 3648.
Davies, D. A. L., 3111.
Davies, D. R. T., 2003.
Davies, D. V., 1624.
Davies, E. B., 1856.
Davies, J. E., 1367.
Davies, L., 471.
Davies, M. E., 55, 1659, 2255, 3496.
Davies, R. E., 2587.
Davies, S. F. M., 1032, 3925, 3929.
Davies, W., 2227.
Davis, B. R., 2030, 2742.
Davis, C. L., 4039.
Davis, D. C., 2544.
Davis, D. E., 1791, 2174, 2506.
Davis, E. V., 1975.
Davis, G. K., 2979.
Davis, L. H., 262
Davis, L. L., 633.
Davis, L. R., 73.
Davis, O. S., 570.
Davis, R., 1475.
Davis, R. E., 2230, 2231.
Davis, R. L., 1148.
Dawbarn, M. C., 861, 1179.
Dawson, F. L. M., 1628, 3447, 3788.
Dawson, R. M. C., 2664, 4134.
Day, F. T., 2353.
Day, P. L., 1873.
Dayton, D. A., 818.
Deane, W. H., 946.
Deanović, Z., 739.
Debacker, H., 1597.
Debackere, M., 2779.
Dechambre, L., 2120.
Decker, G. C., 1801, 3998.
DeCosta, L. C., 505.
Dedić, K., 383, 2772, 3841.
DeEds, F., 1577.
Deem, A. W., 3313.
Defendi, V., 2224, 2931.
DeFoliart, G. R., 1469.
Defranceschi, L., 650.
Deiana, A., 807.
Deinhardt, F., 779.
Deininger, G., 3047.
Deitch, A. D., 2322.
Dekker, N. D. M., 3656.
Delak, M., 796, 797, 1099, 4092.
Delaplane, J. P., 1552, 1791, 2506, 4072.
Delappe, I. P., 72.
Delez, A. L., 1059.
Delić, S., 833, 1482.
Delouche, J. C., 3400.
DeMott, T., 902.
Denneny, J. M., 666.
Dennerline, R. L., 1322.
Dennis, W. R., 812, 2917.
Denton, C. A., 3667.
Denton, D. A., 529, 906, 1229, 1935.
Deom, J., 3461.
Deouell, J., 1104.
Depelchin, A., 2643, 3705.
Derbyshire, J. B., 2717.
Derivaux, J., 317, 1271.
Derrick, E. H., 232.
Deschiens, R., 744, 3626.
Deshpande, P. D., 2575, 2576.
Desowitz, R. S., 2802.
Desprès, P., 995.
Destombes, P., 743.
DeTray, D. E., 123, 2155.
Detweiler, D. K., 2283, 3416, 3417.
Deutsch, H. F., 1518.
Devillard, J.-P., 3151.
Devos, A., 34, 682, 2930.
Dewey, D. W., 3678.
von Dewitz, J.-A., 49.
Dhake, P. R., 2450.
Dhanda, M. R., 2498.
Dhennin, Leone, 1039, 1763, 2826, 3212, 3213.
Dhennin, Louis, 1039, 1763, 2826, 3212, 3213.
Diamond, L. S., 2099.
Dias, V. M., 3493.
Dick, A. T., 851, 2294.
Dick, E. A., 2375, page 348.
Dick, E. C., 1515.
Dick, M. I. B., 903.
Dickerson, J. W. T., 3754.
Dickson, A. D., 2251.
Diernhofer, K., 365.
Diesem, C. D., 2679.
van Dieten, S. W. J., 1257.
Dieter, R., 326.
Dietz, O., 4065.
Dikmans, G., 726.
Dikshit, P. K., 3317.
Dillon, R. D., 512.
Dimić, J. M., 1544.
Dimitrov, S., 730.
Dineen, C., 1665.
Diner, W. C., 200.
Dinnik, J. A., 2912.
Dinnik, N. N., 2912.
Dinning, J. S., 1873.
Dinter, Z., 2160, 2825, 3211.
DiPillo, F., 1958.
Dishington, I. W., 2581.
Disque, D. T., 1536.
Dissanaike, A. S., 3558.
Dissanaike, G. A., 3631.
Diven, R. H., 2959.
Dixon, A. D., 956, 2636.
Dixon, F. J., 2521.
Djang, A. H. K., 336.
Djetvaj, M., 1063.
Dmochowski, L., 1145, 3297.
Dobberstein, H., 1728.
Dobberstein, J., 314.
Dobrowolska, D., 2554.
Dobson, A., 1531.
Dobson, H. L., 535.
Dobzhansky, T., 303.
Dodd, D. C., 1213, 2596.
Dodd, F. H., 4.
Dodds, C., 1989, page 109.
Dodds, E. C., 1957.
Dodson, L. F., 2642.
Döbörhegyi, F., 2018.
Döcke, F., 2338.
Doggart, J. R., 2946.
Dobotaru, V., 1326, 1327.
Dolan, M. M., 2081.
Doll, E. R., 772, 1730.
Dollahite, J. W., 241, 3312.
Dollar, A. M., 1517.
Dolowy, W. C., 2006.
Domański, E., 2554.
Domermuth, C. H., 1788, 3185.
Donati, E. J., 678, 2614.
Done, J. T., 1066, 2159, 2982.
Doney, J. M., 3455.
Donker-Voet, J., 982, 3107.
Donigiewicz, K., 2904.
Donovan, G. A., 4053.
Dordević, D., 1771.
Dormer, B. A., 2002.
Dorsi, J., 3102.
Dorsman, W., 1135.
van Dorssen, C. A., 1000.
Dost, F. H. 15.
Dott, H. M., 3767.
Dotta, U., 3657.
Doty, R. B., 1722, 2065.
Dougherty, E., 882, 897.
Dougherty, R. W., 846, 3749.
Douglas, F. D., 1902.
Douglas, J. R., 1136.
Douvres, F. W., 1122, 2539, 3632.
Dow, C., 1622, 1909.
Dow, M. G. C. M., 1846.
Dowben, R. M., 2594.
Dowden, D. R., 847.
Dowe, T. W., 1168.
Dowling, D. F., 3733.
Downey, N. E., 2069, 3356.
Downing, T. O., 678.
Downs, C. M., 2178, 2179.
Doyle, J. T., 3416, 3417.
Doyle, L. P., 570, 1675.
Dracy, A. E., 2939.
Drăghici, D., 2047.
Dragonas, P., 2806.
Draper, H. H., 2574, 2950.
Drescher, J., 776, 777, 3980.
Drewniak, E. E., 633.
Dreyfus, J. -C., 2994.
Drill, V. A., 1224.
van Drimmelen, G. C., 2041, 2415.
Driver, F. C., 366, 992, 1724, 3861.
Drozhzhin, V. N., 1006.
Drudge, J. H., 1111, 1486, 1798, 4025.
Drury, A. R., 3891.
Dubos, R. J., 978, 979, 2730.
DuBose, R. T., 1552, 4072.
Dubovuii, S. Z., 3553.
Duchaine, S. A., 736, 3041.
Duchoň, T., 3872, 3873, 3874, 3876, 3877.
Dudorova, E. P., 2485.
Düwel, D., 2207, 1093.
Dugal, L. P., 2604.
Dumas, N., 1037, 3257.
Dun, R. J., 1630.
Dunaeva, T. N., 983.
Duncan, D. C., 534.
Duncan, W. R. H., 2254.
Dunlop, A. A., 1234, 2446.
Dunlop, W. R., 1738.
Dunn, D. R., 170.
Dunn, H. O., 2662.
Dunne, H. W., 120.
Dunnet, G. M., 607.
Dunstone, J. R., 1857.
Dupont, M., 2558.
Dupuis, Y., 3320.
Durand, M., 3744.
Duranti, G., 12.
Duranti, G., 12.
Durfee, W. K., 4099.
Durham, W. F., 2300.
Duričić, I., 1771.
Durie, P. H., 1119.
Durieux, J., 2718.
Durieux, M., 2718.
Dyce, A. L., 1072.
Dyce, K. M., 1206, 3751.
Dye, J. A., 2115, 2607, 3349.
Dye, W. B., 2949.
Dyer, A. J. 1485.
van Dyke, H. B., 2519.
Dyrendahl, S., 299, 301, 2688.
Dysart, T. H., 1630.
Dyssegaard, A., 1571.
Dzhilavyan, K. A., 401.
Džumurov, N., 1482.

Eade, N. R., 2652.
Eadie, J. M., 745.
Eakin, R. E., 3173.
Easterbrooks, H. L., 3010.
Echegaray, A. V., 3571.
Eckman, P., 2401.
Economou-Mavrou, C., 2589.
Eddy, G. W., 152, 473, 1572.
Eden, E., 532.
Edeson, J. F. B., 2210.
Edgar, D. G., 3052.
Edgar, S. A., 804, 2544.
Edgington, B. H., 3506.
Edlefsen, J., 2937.
Edmondson, P. W., 2280.
Edward, D. W., 666.
Edward, P. R., 986, 2032, 2748.
Edwards, H. M., 3379.
Edwards, O. F., 1788.
Edwards, P. Q., 718.
Edwards, R. G., 940.
Edwards, S. J., 647.
Eger, W., 3388.
Egorov, Y. G., 803.
Ehlers, M. H., 283.
Ehrenford, F. A., 172.
Ehrenkranz, N. J., 977.
Ehrentreich, F., 481.
Ehrle, A., 994.
Ehrsam, H. R., 1698.
Eide, G. W., 1381.
Eigner, E. A., 3760.
Eisenstark, A., 1786.
Ekman, L., 3369.
Elam, C. J., 530.
Elam, G. W., 1486, 1798, 4025.
El-Attar, T., 3441.
Elberg, S. S., 386.
Elcoate, P. V., 3327.
Elder, J. M., 379.
Eldridge, R. J., 1281.
Elek, S. D., 2, 2015.
Eliseev, A. P., 594.
Elkinton, J. R., 1508.
Elkjaer, R., 3341.
Elliot, J., 347, 1638.
Elliot, J., 347, 1638.
Elliott, G. A., 2995.
Elliott, R. F., 3390.
Ellis, D. J., 3059.
Ellis, R. J., 986.
Ellis, W. C., 3328.
Ellis, W. W., 2948.
Ellison, T., 245.
Elmlinger, P. J., 558.
Els, T., 2845.
Elsworth, R., 306.
El'tsov, S. G., 604.
Elvehjem, C. A., 2575, 2576.
Ely, F., 614, 1613, 3766.
Ely, R. E., 243.
Emberley, N. W., 2370.
Emdin, R. 4013.
Emel'yanov, S. V., 3737.
Emerick, R. J., 1121, 3282.
Emery, J. B., 2864.
Emmens, C. W., 1266, 1625.
Emmerson, M. A., 1267.
Emro, J., 4023.
van den Ende, M., 90.
Ender, F., 2581.
Endo, M., 1397.
Endrejat, E., 799.
Eness, P. G., 1267.
Engel, F. L., 2969.
Engelund, A., 2593, 3341, 3686.
England, D. C., 4010.
Engle, P. H., 3438, 3786.
Englert, H. K., 2843.
Enigk, K., 167, 1093, 2207, 3627.
English, J. E., 367.
Ennio, B., 1541.
Enright, J. B., 781.
Ensminger, M. E., 2954.
Ensor, C. R., 384.
Entel, H. J., 3504.
Entessar, F., 1378.
Entwistle, D. M., 1366.
Enzie, F. D., 2214.
Epps, N. A., 2656.
Eppson, H. F., 237.
Epstein, H., 3077.
Epstein, H. G., 248.
Epstein, S. S., 2785, 2786.
Erb, R. E., 283, 624, 948, 2326.
Ercegovac, D., 118.
Ercoli, N., 2800.
Ergün, H., 3627.
Erichsen, S., 1758.
Eriksson, K., 3057.
Van Erkel, G. A., 525.
Erlanger, B. F., 1464.
Ermachenkov, N. N., 150.
Erne, K., 2626, 4090.
Ernek, E., 3949, 3950.
Ershoff, B. H., 208, 541.
Esposito, M., 3167.
Esslinger, J. H., 3614.
Estela, L. A., 1778, 3227.
Estergreen, V. L., Jr., 2326.
Erwin, E. S., 2959.
Esyutin, A. V., 879.

Etgen, W. M., 614.
Euzeby, J., 1138.
Euzeby, J. A., 3275.
Evans, C. Lovatt, 549, 907.
Evans, E. T. Rees, 2384.
Evans, H., 2233.
Evans, H. M., 1537.
Evans, I. A., 3726.
Evans, J. V., 1244, 2314.
Evans, L. B., 2056.
Evans, R. J., 2557.
Evans, S. A., 2848, 3226.
Evans, T. M., 2531, page 224.
Evans, W. C., 3726.
Eveleth, D. F., 1274.
Evens, F., 66.
Everett, N. B., 2573.
Everson, G. J., 2586.
Evplov, N. N., 3550.
Ewing, W. H., 2030, 2742.
Eyles, D. E., 1410, 1759, 1837.
Eyquem, A., 2188.

Fabricant, J., 1447, 3179.
Fahey, J. E., 721.
Fahey, J. L., 1854.
Fain, A., 477, 2530.
Fairclough, R., 3618.
Faithful, W. C., 3677.
Falke, D., 3218.
Fallon, G. R., 3776.
Fang Shih-chieh, 2790.
Fankhauser, R., 1637.
Fantl, P., 597, 4113.
Farber, J. F., 678.
Farina, R., 704, 3156.
Farinacci, C. J., 2132.
Farr, M. M., 3916.
Farrar, J. T., 1641.
Farrell, R. K., 760.
Farrer, K. T. H., 903.
Fasselt, K., 3134.
Fast, J., 2441.
Fastier, L. B., 425, 432, 2165.
Faulkner, D. E., 3077, 3460.
Fawcett, E. J., 3069.
Fayet, M.-T., 771, 1764, 3563.
Fazekas de St. Groth, S., 2883, 2884.
Fazekas, G., 3171.
Federmann, M., 2207.
Federova, N. I., 451.
Fedida, M., 2462.
Fedoroff, S., 2638.
Feigan, G. A., 248.
Feils, G., 360.
Feja, E., 3134.
Feldman, G. L., 858, 2613.
Feldman, H. A., 3083.
Feldman, W. H., 1324.
Fell, B. F., 2693.
Feng, P. C., 3727.
Feng, Y. S. L., 2967.
Fenner, F., 1420, 3572, 3575, 3593.
Fennestad, K. L., 1372, 3152, 3881.
Fenton, B. K., 1638.
Ferenčík, M., 3872, 3873, 3874, 3875, 3876, 3877.
Ferguson, L. C., 1398.
Ferguson, R. W., 1131.
Ferguson, T. M., 858, 2613, 3003, 3176.
Ferney, J., 873, 936.
Ferreira Neto, J. M., 3242.
Ferreira Netto, J. M., 1530, 3321.
Ferris, R. D., 2885.
Field, H. I., 850, 2981.
Fielder, F. G., 308.
Fieldsteel, A. H., 433.
Fife, M. A., 986.
Figueiredo, J. B., 3242.
Filmer, D. B., 3658.
Filmer, J. F., 1903, 3459.
Filotto, U., 4122.
Fillseth, O., 3431, 3771.
Filshie, I., 3005.
Finch, C. A., 3322.
Findlay, H. T., 3130.
Fink, K., 2598.
Fink, R. M., 2598.
Finkelstein, R. A., 1457.
Finland, M., 2072, 3083.
Finlayson, A. V., 1057.
Finter, N. B., 95.
Fiocre, B., 3257.
Firehammer, B. D., 3105.
Fischer, G. W., 2035.
Fischer, M., 2403.
Fischer, M. I., 3327.
Fish, N. A., 373.
Fisher, E. W., 2307.
Fisher, H., 1177, 1847.
Fisher, L. E., 2240.
Fisher, M. W., 3895.
Fisk, G., 2590.
Fitzgerald, J. E., 2777.
Fitzgerald, P. R., 1745.
Fitzhugh, O. G., 1910, 2298.
Fitzpatrick, R. J., 585, 919, 3031.
Flachat, C., 872, 2462.
Flamm, H., 3842.
Flatt, W. P., 188, 505.
Flesher, A. M., 4073.
Flick, J. A., 2040.
Flint, J. C., 2090, 3313.
Floegel, C., 1961.
Flood, J. C., 2662.
Florent, A., 2779, 2780.
Florio, R., 877.
Florkin, M., 966.
Flowers, A. I., 1552, 2990, 4072.
Fluharty, D. M., 3301.
Flux, D. S., 1182.
Fodstad, F. H., 3474.
Fölster, K., 297.
Fogedby, E. G., 2116, 2117.
Fogg, D. E., 402.
Foley, E. J., 973.
Foley, R. C., 3740.
Folk, G. E., Jr., 3060.
Folley, S. J., 1057.
Foltz, V. D., 3123.
Fong, J., 386.
Fonseca, J., 493.
Fontaine, J., 2462.
Fontaine, M., 133, 1144, 1763, 2163, 3539.
Fontaine, M. P., 3703.
Fontes, A. K., 1145, 2932.
Fontes, I., 2223.
Foot, A. S., 2244.
Foote, L. E., 2458.
Foote, R. H., 2659, 2662, 3035.
Forbes, R. M., 519, 1523.
Ford, E. J. H., 3834, 4117.
Ford, J., 727.
Fordtran, J. S., 3903.
Forgács, B., 3901.
Forgacs, J., 1730.
Forman, Z., 3023.
Fornoni, Q., 3081.
Foršek, Z., 1439.
Forsyth, D. A., 3634.
Fortner, J., 3586.
Foschi, M., 105.
Fosgate, O. T., 613.
Fossatti, M. J., 1395, 2797.
Foster, E. M., 845.
Foster, R., 2198.
Fowler, R. E., 940.
Fowler, S. H., 3783.
Fox, M. S., 714.
Fracasso, B., 672, 3863.
Francetić, M., 121.
Francis, G. E., 3989.
Francis, J., 3462, page 224.
Frank, A. H., 726, 2066.
Frank, F. W., 1018, 1382.
Frank, J. F., 886.
Frank, M. H., 2006.
Frank, N. A., 1999, 3084, 3506.
Frankel, H. M., 3060.
Franklin, M. C., 842.
Franklin, T. E., 1755.
Fraño, J., 762.
Fraps, R. M., 4147.
Fras, A., 3858.
Fraser, A., 1290, page 55.
Fraser, A. F., 287.
Fraser, A. S., 3404.
Frawley, J. P., 2298.
Frazer, S. C., 2944.
Frazier, J. A., 2544.
Freedman, D. G., 4154.
Freedman, L. R., 3854.
Freeman, A., 1710.
Freeman, D. A., 3866.
Freier, E. F., 203
Freinkel, N., 1863.
Fremming, B. D., 329.
Frenkel, J. K., 1411.
Frens, A. M., 3444.
Freudenberg, F., 2363.
Friars, G. W., 1261.
Fried, W., 1929.
Friedman, M. E., 3036.
Friend, D. W., 2313.
Fritts, D. H., 1471.
Fritzsche, K., 846.
Froman, S., 333.
Frost, D. V., 1750.
Frunder, H., 2627.
Fry, D. E., 142, 1445.
Fryer, H. C., 1786.
Fuerst, H. T., 1483.
Fürst, W., 3255.
Füzi, M., 3516.
Fuhrimann, H., 878.
Fujimoto, Y., 2490, 3421.
Fuller, J. L., 2184.
Fullmer, H. M., 1740.
Fulthorpe, A. J., 3520.
Fulton, J. D., 67, 468, 2192.
Funke, H., 1658, 1913.
Furman, D. P., 791.
Furutani, T., 109, 3588, 3589.
Fusillo, M. W., 2305.
Fussgänger, R., 3104.
Fust, B., 11.

Gabrielli, G., 690.
Gaddum, R., 149.
Gadzhiev, K. S., 697.
Gaggero, C., A., 407.
Gailiunas, P., 800, 2195.
Gál, 3101.
Galaboff, S., 1400.
Galassi, D., 774.
Gale, C., 2612, 3848.
Gale, D., 3825.
Galins, N., 3265.
Gall, Z., 833.
Gallagher, C. H., 1174.
Gallian, M. J., 1713, 3892.
Gallo, C., 661.
Gallut, J., 1380.
Galton, M. M., 2766, 3157, 3885.
Galysh, F. T., 3923.
Gambino, U., 1926.
Gamble, H. J., 2323.
Gamčík, P., 1009, 3960.
Gandar, R., 2352.
Gander, J. E., 1588.
Ganong, W. F., 4121.
Gantt, W. H., 2603.
Garber, K., 2964.
Garbers, G. V., 26.
Garcia, T. P., 2253.
García Rodríguez, I., 2027.
Gardiner, J. L., 1033.
Gardner, D. E., 2953.
Gardner, R. J., 1796.
Gargani, G., 692, 2049, 2760, 2762, 2763, 3869.
Garkavi, B. L., 171.
Garner, R. J., 962.
Garp, N., 1326.
Garren, H. W., 1690, 2410, 2411.
Garrigus, U. S., 1523.
Garry-Andersson, A.-S., 554.
Gartner, R. J. W., 3687.
Garton, G. A., 2254.
Garvey, J. S., 2888, 3259.
Gáspár, Z. N., 4054.
Gastaldi, C., 2725.
Gastambide-Odier, M., 3096.
Gastaut, H., 2986.
Gastellu, C., 151.
Gastinel, P., 309.
Gates, D. W., 1753.
Gaugusch, Z., 987, 3319.
Gauthier, J., 711, 1380.
Gauthier-Villars, P., 1450.
Gavez, E., 1668, 1723.
Gavrichenkov, A. I., 1804.
Gay, M., 11.
Gayot, G., 741.
Gdovin, T., 766.
Gee, J., 1971.
Gee, R. W., 1130, 3518.
Gee, W., 3027.
Geessink, E. F., 3444.
Gehring, K., 304, 3251.
Gehring, W., 3019.
Gehrke, C. W., 3306.
Geiger, W., 3560.
Geiser, K. J., 199.
Geleta, J. N., 127, 3941.
Gemmell, M. A., 1811, 1812.
Gengozian, N., 461.
Gentile, A., 91, 691.
Gentiles, M. A., 2457.
Gentles, J. C., 391.
Gentry, R. F., 2624.
Gentzkow, C. J., 3642.
Geoffroy, M., 382.
Geoffroy, R., 4055.
Georg, L. K., 57, 392, 1023, 2444.
George, L. A., 176, 4075.
George, L. A., Jr., 2091, 3348.
Georgescu, L., 2094.
Georgescu, V., 2025.
Georgi, C. E., 1587.
Georgieff, R., 2974, 2975.
Gerber, W., 3955.
Gerende, J. E., 3951.
Gerhardt, P., 2075, 3879.
Gericke, D., 3388.
Gerriets, E., 3124, 3574.
Gershoff, S. N., 2952.
Gershon-Cohen, J., 2936, 4119.
Gerson, T., 2570.
Getta, G. I., 2102.
Geurden, L., 2930.
Geurden, L. M. G., 34, 682.
Ghadially, F. N., 3738.
Ghanem, Y. S., 3756.
Gharib, H. M., 3175.
Gheorghiu, I., 1430.
Ghione, M., 3015.
Gianforte, E. M., 1717.
Giardinello, F. E., 1975, 2562.
Gibson, C. L., 1410.
Gibson, E. A., 491, 1686, 1897.
Gibson, J. B., 499.
Gibson, T. E., 3629, 4029
Gilbert, Y., 1454.
Gilfillan, J. L., 77.
Gilka, F., 1375.
Gill, J. C., 631.
Gillespie, J. H., 112, 1780, 2851.
Gillespie, R. J. G., 2559.
Gillespie, R. W. H., 705.
Gilray, J., 1636
Ginsberg, A., 1253, 4018.
Ginsberg, H. S., 1442.
Gioia, V., 3159.
Giolitti, G., 4101.
Girard, K. F., 2023.
Girard, O., 3968.
Giroud, P., 1037, 1450, 1451, 1452, 3257.
Gitler, C., 2237.
Gitter, M., 350, 1022.
Del Giudice, V., 4066.
Glättli, H. R., 547.
Glagolev, P. A., 965.
Glascock, R. F., 1957.
Glasser, M. E., 2633.
Gledhill, A. W., 63.
Gleeson, J. P. 1256.
Glenday, A. C., 1182.
Glenn, M. W., 1332.
Gless, E. E., 3267.
Glick, B., 2568, 3263.
Glick, D., 203.
Glover, F. A., 271, 1619.
Glover, T. D., 3042.
Gmitter, J., 1084, 3867.
Godfrey, D. G., 403, 3195.
Goding, J. R., 1229, 3758.
Godley, W. C., 2336.
Goerttler, V., 968, 1342, 3811, page 348.
Goetsch, G. D., 3696.
Götz, L., 50.
Gogoasă, V., 2025, 2026.
Golberg, L., 246, 523, 2250.
Goldman, C. L., 2168, 3252, 3253.
Goldman, M., 3557.
Goldsworthy, P. D., 3424.
Goldwasser, E., 1929.
Goldwasser, R., 440.

Goldwasser, R. A., 2518, 3944.
Goldzieher, J. W., 945.
Gołębiowski, S., 2043, 2412, 2438.
Goller, H., 4124.
Golubev, N. F., 1824.
Golubeva, E. D., 1506.
Golvan, Y. J., 795.
Gomberg, H. J., 2543.
Gomul'kin, A. A., 1480.
Goncharov, I. E., 3552.
Gonzalez, G. S., 1760.
Good, B. F., 1216.
Goodban, J. W. D., 642.
Goodchild, C. G., 4015, 4016.
Gooding, C. D., 1254, 3763.
Goodman, F. D., 1973.
Goodwin, L. G., 3640.
Goodwin, R. F. W., 465, 520, 1870, 2161, 3240, 3742.
Gordis, L., 1958.
Gordon, H. A., 1467, 3711.
Gordon, H. McL., 2538, 3290, 4024.
Gordon, I., 1268, 1269, 1626.
Gordon, J. G., 2320.
Gordon, M. A., 3529.
Gordon, R. F., 838, 3127.
Gordon, R. M., 3194.
Gordon, W. S., 2148.
Goret, P., 133, 1454, 2890, 3831.
Gorham, J. R., 431, 769, 2371.
Gorski, J., 624.
Gorzhkovskaya, S. I., 1687.
Gossett, F. O., 1137.
Goto, G., 3707.
Gottron, H. A., 1368.
Gouéffon, Y., 97.
Gouge, H. E., 3390.
Gould, D. J., 2531, page 224.
Gould, S. E., 2543.
Gould, T. C., 3326.
Goulson, H. T., 480.
Gourlay, R. N., 2855.
Goyon, M., 1239, 3110.
Graber, M., 3636.
Grabowski, K., 1875.
Gracey, J. F., 2582.
Grachev, I. I., 699.
Graeger, K., 2329.
Graesser, F. E., 811.
Graf, R., 1961.
Grafe, A., 2510, 2511.
Graham, N. McC., 2555.
Graham, O. H., 1802, 3997.
Graham, W. R., 52.
Grahn, D., 2637.
Grainger, R. B., 847.
Gralheer, H., 122.
Grandadam, M. A., 3028.
Granett, P., 2525.
Grant, A. B., 533, 855.
Grant, C. A., 3295.
Grant, J. H., 620.
Grant, P. T., 67.
Grăsoiu, G., 1310.
Grau, C. R., 1503.
Grauwiler, J., 3715.
Graves, F. T., 2551.
Gray, A. P., 3468, page 418.
Gray, D. M., 1395, 2797.
Gray, J., 2661.
Gray, J. E., 3184, 3384.
Gray, M. L., 342, 343, 3106.
Greatorex, J. C., 1202, 1701.
Gréczi, E., 1041, 2829.
Green, B., 2963.
Green, H. F., 4067.
Green, J. H., 2107.
Greenberg, S. M., 1866, 1867, 4057.
Greene, V. W., 2749.
Greenfield, J. G., 1649, page 109.
Greenland, R. M., 3969.
Greenman, V., 387, 2616.
Greenstein, J. S., 3740.
Greenwood, A. W., 2687.
Greenwood, D. A., 2288, 4059.
Greer, M. A., 3347.
Gregerson, M. I., 559.
Gregg, N. C., 2509.
Gregoire, A. T., 3035.
Gregorovič, V., 2843.
Gregory, D. W., 3359.
Gregory, P. W., 3753.
Gregory, T. S., 2447.
Greig, A .S., 1773, 3590.
Greiger, W. B., 3258.
Grenan,M. M., 2891.
Gresham, G A., 2564.
Greśíková, M., 1051.
Grétillat, S., 795, 1134, 1810.
Greuel, E., 826.
Grewal, M S., 69.,
Grey, C. E., 1145.
Gribanov, V., 3215.
Gribetz, D., 200.
Griem, W., 2984.
Grieve, J. M., 1253.
Griffith, R. S., 3012.
Griffiths, D. B., 884.
Griffiths, R. C., 2111.
Griffo, J. V., Jr., 155.
Grigg, G. W., 1951.
Grigoriu, N., 1736.
Grigoryan, G. A., 4014.
Griminger, P., 1405.
Grímsson, H., 426, 1923.
Grin, I. E., 1392.
Gringer, I., 373.
Grippin, C. H., 1513.
Gritsenko, A. K., 449.
Groch, L., 967.
Grögel, K. F., 3524.
De Groodt, M., 1939, 2259.
Grootenhuis, G., 1632.
Gross, M. A., 839.
Gross, W. B., 351, 724, 1337, 3180.
Gross, W. O., 638, 3064.
Grossbard, E., 1021.
Grosskaus, D., 3477.
Grosso, A. M., 1038.
Groth, A. H., Jr., 3340.
Groth, W., 2649.
Groupé, V., 2504.
Groves, T. W., 2541.
Grudzień, C., 2017.
Grüneberg, H., 302, 952.
Gruenstein, M., 2553.
Grumbles, L. C., 1552, 4072.
Grummer, R. H., 2579.
Grundboeck, J., 696.
Gruner, J., 4065.
Grunert, E., 1954, 2419.
Gryczowa, B., 2422.
Grzimek, B., 1291.
Gualandi, G. 2858.
Guarini, G., 104, 3954.
Gubaidullin, L. S., 2097.
Günther, E., 3420.
Güralp, N., 486, 3283, 3926, 4035.
Guercio, V., 661.
Guerin, L. A., 1212.
Guerin, M. M., 1050.
Guerra, M., 2762, 2763, 3141.
Gürtürk, S., 1060.
Gütte, J. O., 1146.
Guillaumie, M., 382.
Guillo, B., 711, 731, 3011.
Guillot, P., 2824.
Gump, R. H., 3532.
Gunn, S. A., 3326.
Gustafson, D. P., 1059, 3229, 3959.
Gutekunst, R. R., 1737.
Guthrie, J. E., 1490.
Gutierrez, J., 2114, 2231.
Gutierrez, J. C., 431.
Guze, L. B., 3854.
Gyenes, L., 3260.
Gylstorff-Sassenhoff, 1291.
György, H., 2497.
György, P., 566.

Haag, F., 945.
Haag, J.-R., 1860, 3329.
Haaranen, S., 1551.
Habel, K., 414, 2469, 2509.
Habel, R. E., 3749.
Hackett, A. J., 3567.
Hackett, P. L., 4075.
Haddow, A., 2220.
Haddow, A. J., 763, 1061.
Haeck, H., 3353.
Häcker, K.-A., 2816.
Hässler, L., 725.
Hafez, E. S. E., 4145.
Hagan, W. A., 960.
Hagen, K. W., Jr., 3392.
Haggard, J. M., 506.
Hahn, F. E., 2408.
Hahn, J., 2337.
Hahn, K., 257.
Hahon, N., 93.
Haiba, M. H., 82.
Haig, D. A., 1055.
Hajdu S., 3865, 3963.
Hajsig, M., 1734, 3486.
Häkioglu, F., 2775.
Halaša, M., 1494, 3930.
Halberg, F., 915.
Hale, J. H., 3581.
Hale, W. H., 1640.
Haleem, A., 2933.
Haley, A. J., 3638.
Haley, T. J, 4073.
Halkett, J. A. E., 3323.
Hall, A. D., 3157.
Hall, L. W., 3393.
Hall, R. E., 663.
Hall, R. J., 1164.
Hall, V. A., 2939.
Hall, W. T. K., 1219.
Hallauer, C., 2870.
Halleck, F. E., 701.
Hallgren, W., 299, 1171.
Halliday, R., 148, 1460, 3608.
Halliwell, G., 64.
Halse, K., 2245, 2246.
Halsey, H. R., 1401.
Halvorson, H. O., 381.
ten Ham, E. J., 3342.
Ham, W. E., 530, 2954.
Hamburger, C., 939.
Hamburger, R., 164.
Hamdy, A. H., 1398, 3402, 3848.
Hamerston, O., 915.
Hamilton, C. M., 3497.
Hamilton, F. J., 1282.
Hamilton, M. A., 2396.
Hammarlund, M .A., 52.
Hammel, H. T., 4109.
Hammer, D., 3389.
Hammond, D. M., 75, 733, 1745, 3921.
Hammond, P. B., 2619.
Hancock, J., 2365.
Hancock, J. L., 1259.
Hanka, L. J., 1267, 3446.
Hanks, J. H., 2015.
Hannan, R. S., 924.
Hansard, S. L., 2458, 3307.
Hansen, H.-J., 235.
Hansen, L. H., 3449.
Hansen, M. F., 1128, 2545.
Hansen, N. F., 3153.
Hansens, E. J., 2525.
Hanson, L. E., 2034.
Hanson, L. J., 3453.
Hanson, R. J., 2130.
Hanson, R. P., 748, 1767, 1775, 2124, 2501, 2508, 2856.
Hansson, C.-H., 899, 2632, 3018, 3394, 3732.
Hansson, E., 1658, 1913.
Harada, K., 427, 764.
Haralambiev, H., 2389.
Harboe, A., 2112.
Harbour, H. E., 708.
Harding, F., 1597.
Harding, J. D. J., 1066.
Hardy, J. D., 4109.
Hardy, W. T., 2145.
Hare, W. C. D., 587.
Harley, J. M. B., 4000.
Harley, R., 3676.
Harm, M., 18.
Harms, R. H., 1404, 2808.
Harnach, R., 695.
Harper, A. E., 2575, 2576.
Harrington, G., 2694, 2713.
Harris, B., Jr., 1151.
Harris, C., 2553.
Harris, J. R., 2716.
Harris, L. E., 1150, 4059.
Harris, M. D., Jr., 329.
Harris, P. N., 574, 1568, 1569.
Harris, P. S., 1894.
Harris, R., 933.
Harris, S. J., 2281.
Harris, W. E., 468, 2192.
Harrison, G. A., 933.
Harrison, H. C., 2577.
Harrison, H. E. 2577.
Harrison, I. R., 3615.
Harrison, R. G., 970, page 684.
Harris-Smith, P. W., 324.
Harrold, J. B., 1754.
Harry, E. G., 1726, 2567.
Harshfield, G. S., 2142.
Hart, D. S., 1183.
Hart, E. W., 1281.
Hart, P., 3338.
Hart, P. C., 3444.
Hart, P. D'A., 3833.
Hartley, W. J., 2459, 2596, 3358.
Hartman, C. G., 290.
Hartman, L., 3423.
Hartman, P. A., 2312, 2313.
Hartman, R. H., 204.
Hartman, W., 901.
Hartree, E. F., 1616, 4132.
Hartwigk, H., 1376, 3846.
Harvey, A. L., 2526.
Harvey, D. G., 3721.
Harwin, R., 3978.
Haskell, A. R., 1539.
Hatch, C., 789, 3996.
Hatcher, J. D., 1243.
Hatfield, E. E., 1523.
Hatke, F. L., 1278.
Hatten, B. E., 3903.
Hauffe, W., 3166.
Hauge, S., 3120.
Hauge, S. M., 3681.
Haurowitz, F., 462.
Hausch, R., 1703.
Haussmann, H. G., 2510, 2511.
Havlík, O., 1423, 2429.
Hawes, R., 3410.
Hawk, H. W., 3114, 3167.
Hawker, R. W., 1921, 1922.
Hawking, F., 3914.
Hawkins, G. E., 508.
Hawkins, G. M., 4050.
Hawkins, J. D., 1459, 3989
Hawkins, W. W., Jr., 3269.
Hawley, G. E., 422, 1682.
Hawthorne, V. M., 330.
Hayashi, J. A., 3986.
Hayes, J. W., Jr., 2300.
Hayman, R. H., 2446, 3406.
Hays, R. L., 1955.
Hayward, B., 2181.
Hazelwood, R. L., 1877.
Head, K. W., 2925.
Head, M. H., 1832.
Head, M. J., 524, 1237, 2244.
Healy, G. M., 1978.
Heaton, F. W., 2961.
Hecke, F., 125, 3238.
Hegland, R. B., 1155.
Hegsted, D. M., 1528, 2952.
Heidelberger, C., 184.
Heidrich, H. J., 3477.
Heilman, D. H., 2420.
Heinemann, W. W., 2954.
Heinicke, W., 1263.
Heisch, R. B., 456.
Heithecker, D., 1018.
Heitman, H., Jr., 3736.
Héjj, L., 2151.
Helbacka, N. V. L., 233.
Helgebostad, A., 2581.
Helle, O., 1381.
Hellegers, A., 2671.
Heller, O., 1785.
van der Helm, G., 2317.
van der Helm, H. J., 1593.
Helmboldt, C. F. 2135, 2136,, 2138, 2272, 3299.
Helwig, D. M., 2431.
Helwig, R., 2453.
Heming, A. E., 1866, 1867.
Hemlep, I., 3164.
Hemmings, W. A., 592.
Hempstead, J. F. D., 1055.
van den Hende, A., 1591.
Henderson, B. J., 4080.
Henderson, F. G., 1568.
Henderson, J. A., 1172.
Henderson, W., 1556, 1693.
Hendricks, S. L., 57.

Hengl, R., 3880
Henle, G., 779.
Henneberg, G., 3980.
Henneman, H. A., 1639.
Hennigar, G. R., 1131.
Henricson, B., 947.
Henry, M., 3332.
Henry, S. S., 2519.
Herbert, C. N., 658.
Herbert, J., 2348.
Herbst, E. J., 3169.
Herlich, H., 808, 1120, 3637.
Hernandez, H. J., 208.
Herndon, J. F., 4057.
Herrera Repullo, A., 2027.
Herrick, J. B., 1470, 1800.
Herrick, J. F., 1324.
Herter, R., 3009.
Herzberg, M., 1722.
Hess, E. A., 614, 1613, 1948, 3766.
Hess, R., 83.
Hess, W. R., 408, 1413.
Hesse, A. L., 2006.
Hessen, L., 1679.
Heuner, F., 17, 1199.
Heuser, G. F., 1147.
Hewetson, R. W., 3310.
Hewitt, R., 3272.
Hewitt, R. M., 1300.
Heymann, C. S., 3232.
Heymann, G., 1287, page 56.
Heywang, B. W., 843, 1507.
Hickey, F., 1173.
Hidiroglou, M., 3217.
Hieronymi, G., 2988.
Higgs, D. F., 2297.
Hignett, P. G., 1617.
Hill, C. H., 194, 1110, 2410, 2411.
Hill, E. C., 1253.
Hill, F. W., 895.
Hill, H. J., 396.
Hill, J. R., 2336.
Hill, K. J., 1540, 1606.
Hill, K. R., 3005.
Hill, R. W., 1077.
Hill, W. C., Osman, 3469. page 348.
Hilliger, H.-G., 4138.
Himeno, K., 1942.
Himes, M. D., 1565, 1566.
Hinds, V. G., 144.
Hine, D. C., 861, 1179
Hinglais, H., 9
Hinglais, M., 9.
Hinshaw, L. B., 352.
Hipólito, O., 3597.
Hirato, K., 2491.
Hiroe, K., 2681.
Hirota, E., 2767.
Hitchings, G. H., 1411.
Hitchner, S. B., 441, 3973.
Hitzman, D. O., 381.
Hitzmann, G., 54.
Hobby, G. L., 3391.
Hobson, D., 28, 29, 358.
Hochfeldt, I., 2407.
Hodgman, S. F. J., 1659.
Hoe, C. M., 577.
Hoefer, J. A., 564.
Högset, I., 288, 1947, 3771.
Hoekstra, W. G., 1121, 2579.
Hoerlein, A. B., 1223, 2024, 3286.
Hörman, S., 1053.
Hörter, R., 2068.
Hofer, A. S., 2842.
Hoffman, J., 1565, 1566.
Hoffman, R. A., 1473.
Hoflund, S., 725, 1563.
Hofstad, M. S., 722.
Hogan, A. G., 1838.
Hogan, J. P., 1162, 1163.
Hogue, D. E., 1513.
Holbrook, A. A., 127, 430, 3941.
Holcombe, R., 2345.
Holcombe, R. B., 2345.
Hollander, V. P., 1931.
Hollister, C. J., 902.
Holló, F., 3463, page 280.
Holman, R. A., 182.
Holmberg, J., 1386.
Holmgren, B., 2146.
Holmqvist, H., 1344.
Holt, A. P., 559.
Holtenius, P., 889.
Holtz, A. H., 3350.
Holub, A., 3023.
Holz, J., 831, 2460.
Holz, W., 3097, 3098.
Holzworth, J., 180, 2111.
Homburger, F., 1959.
Homeyer, P. G., 3309.
van 't Hooft, A. J. G., 1635.
Hoorens, J., 949.
Van Hoosen, N., 3355.
Hopkins, S. R., 3239.
Hopkins, T. I., 473.
Hopkins, T. L., 1572.
Hopping, J. L., Jr., 1023.
Hopwood, M. L., 396
Horava, A., 4077.
Horger, L. M., 1623.
Horiuchi, T., 185.
Hornibrook, J. W., 2509.
Horrocks, D., 545.
Horstman, V. G., 4075.
Horton-Smith, C., 3920.
Horvath, D. J., 505.
Horváth, G., 1956.
Horváth, I., 1612, 3889.
Hoskins, H. P., 646.
Hotchkiss, R. D., 714.
Hotz, G., 138.
Houck, J. C., 605.
Howard, A., 1943, 1944, 1945.
Howard, B., 2634
Howard, D. H., 2420.
Howard, L. B., 891.
Howarth, J. A., 1715, 2976, 3884.
Howell, D. E., 2196.
Howell, D. G., 347.
Howell, J., 338.
Hoyer, B. H., 2776, 3602.
Hoyt, A., 336, 1322.
Hrgović, J., 710.
Hrgović, N., 1689.
Hubbard, E. D., 4020.
Huber, W. G., 2260, 2354.
Huck, R. A., 420, 2480.
Huckabee, W. E., 2671.
Huddleson, I. F., 1359.
Hudman, D. B., 2313.
Hudson, C. B., 361.
Huebner, R. A., 902.
Huffman, C. F., 1833.
Huffman, K., 129.
Hugenholtz, P. G., 3898.
Hughes, L. E., 2247.
Huisman, T. H. J., 1593, 1594, 2317.
Hull, W. B., 2531, page 224.
Hulliland, T. J., 2854.
Hulse, E. C., 3508.
Humphrey, J. H., 2183, 2302. 2303.
Humphrey, R. D., 2362.
Hungate, R. E., 2114.
Hunsicker, E. R., 2377, page 348.
Hunt, W. G., 2454.
Hunter, C. A., 1699, 3512.
Hunter, D. A., 3065.
Hunter, G. W., Jr., 155.
Huppert, M., 339, 340.
Hurley, L. S., 2586.
Hurst, P., 200.
Hurst, R. O., 943.
Hurst, V. 2336.
Hussain, A., 2933.
Huston, T. M., 1584.
Hutchens, T. T., 641.
Hutcheson, M. K., 2583.
Hutchins, D. R., 1272.
Hutchinson, L., 3108.
Hutchinson, J. C. D., 1940.
Hutchinson, K. J., 841.
Hutchison, A. M., 3111.
Hutson, G. A., 2840.
Hutt, F. B., 210, 1500, 3809, page 479.
Hutton, E. M., 3382.
Hutzler, L. B., 1111.
Huygelen, C., 2908.
Huysman, A., 2779.
Hyde, J., 1441.
Hynek, B., 3619.
Hynes, H. B. N., 3646.
Hyslop, N. St. G., 1735.

Ianev, E., 2389.
Ichihara, A., 4088.
Ichimura, K., 238.
Ida, T., 1652.
Ihenlenburg, H., 3224.
Ikegami, T., 1071.
Illés, J., 3931.
Imagawa, D. T., 444.
Imaizumi, K., 3197.
Inaba, Y., 427, 1449.
Ingle, D. J., 602.
Ingram, P. L., 4050.
Innes, J. R. M., 678, 951, 2614, 3373.
Inui, S., 2726.
Inukai, T., 2536.
Ionică, C., 2047.
Iopa, I. S., 1575.
Ipatenko, N. G., 1609.
Ippolitova, V. I., 965.
Irwin, C. F. P., 390.
Irwin, M. R., 3986.
Isaacs, A., 446, 447, 448, 2131.
Iseler, P. E., 2223, 2932.
Ishak, K. G., 1476.
Isham, R. R., 3355.
Ishaq, S. M., 2817.
Ishida, K., 1938, 3669.
Ishiguro, H., 2879, 2809.
Ishii, S., 109, 140, 427, 764, 1424, 1449, 1456, 2859, 3589.
Ishitani, R., 185, 1449.
Ishizaka, K., 3261.
Ishizaki, R., 1424, 1456, 2859.
Isler, H., 1864.
Isopescu, I., 1310.
Itabashi, H., 1938, 1941.
Ito, S., 1397.
Ittner, N. R., 608.
Ivanov, B. G., 2735.
Ivanov, I., 981.
Ivanov, M. M., 1363.
Ivanov, X., 1043, 2790.
Ivashkov, I. S., 470.
Ives, J. C. J., 375.
Iwamotto, I., 1071.
Iwanoff, X., 2790.
Iwata, A., 2767.

Jaap, R. G. 3450.
Jaartsveld, F. H. J., 2414, 3503.
Jack, A., 3825.
Jackson, D., 937.
Jackson, F. C., 1661.
Jackson, H. D., 515.
Jackson, N., 859.
Jackson, R. S., 1370.
Jacob, 3653.
Jacob, H., 3278.
Jacobs, L., 724, 1036, 3936, 3937.
Jacobson, D. R., 847, 2230.
Jacobson, L. O., 1929.
Jacobson, N. L., 5111, 1155, 1504, 3309.
Jacotot, H., 1065, 2046, 2492, 2493, 3243, 3591.
Jacquot, R., 1289, 3665, page 56.
Jaffe, W. P., 2340, 3666, 4049.
Jagger, J., 4084.
Jahnes, W. G., 1740.
Jakerow, A., 525.
Jakobsen, K. F., 3449.
Jakšić, B. D., 703.
Jakšić, B. L., 1440, 1336.
Jakubowski, S., 3817.
Jambor, W. P., 1390.
James, J. C., 1150.
James, J. D., 1727.
James, W. D., 1914, 2629.
Jameson, J. E., 362, 368, 2370, 3130.
Jamieson, N. D., 202, 2798.
Janjatović, M., 1567, 3725.
Janković, B., 1689.
Janok, J., 1015.
Janowski, H., 3236.
Jansen, J., 1042, 2830.
Jarrett, I. G., 1180.
Jarrett, W. F. H., 330, 551, 2143, 2264.
Jaskolski, H., 2017.
Jastrzębski, T., 3584.
Jefferies, W. McK., 3790.
Jeffery, G. M., 3631.
Jeleff, W., 2844.
Jelínek, V., 880.
Jemrić, K., 121. 3240.
Jennings, A. R., 1870, 2161,
Jennings, D. B., 1243.
Jennings, J. C., 3165.
Jennings, R. C., 2236.
Jennings, S., 2307.
Jensen, C. E., 2668, 2669.
Jensen, H., 268.
Jensen, J. H., 1371.
Jensen, K. E., 2471.
Jensen, L. S., 1231, 2566.
Jensen, P. T., 2714.
Jensen, R., 52, 1425, 2090, 3313.
Jenson, R. S., 3473.
Jeska, E. L., 3642.
Jeske, H. A., 1750.
Jettmar, H. M., 2472.
Jewell, P. A., 1599.
Jezeski, J. J., 2749.
Jezierski, A., 2845.
Ježková, D., 3023.
Jitaru, N., 1327.
Joaquin, Z. B., 3193.
Jönsson, G., 3695.
Johansson, H., 3053.
Johansson, K. R., 1515. 2560, 2938.
Johns, A. T., 1831, 1841, 1842,
Johnson, A. E., 1745, 3921.
Johnson, A. M., 4060.
Johnson, B. C, 4052.
Johnson, C. A., 3615.
Johnson, D. W., 129, 4023.
Johnson, E., 3405.
Johnson, E. I., 3273.
Johnson, E. L., 891.
Johnson, H. D., 3396, 3399, 4105.
Johnson, I. S., 2552.
Johnson, J. M., 1120, 1182.
Johnson, K. E., 1529.
Johnson, R. H., 3309.
Johnson, W. T., 3994.
Johnston, A. M., 2529.
Johnston, D. G., 720.
Johnston, J. E., 938.
Johnston, R. V., 770.
Joiner, W. P., 1584.
Jolly, D. W., 1221.
Jones, E. E., 1370.
Jones, E. M., 2197.
Jones, F. E., 1410.
Jones, I. Chester, 964.
Jones, J. D., 2960.
Jones, J. E. T., 3712.
Jones, L. M., 3130, 3868.
Jones, M. E., 2274.
Jones, O., 664.
Jones, R. F., 3494.
Jones, R. S., 2788.
Jones, T. C., 959, 4040, page 56.
Jones, W. D., Jr., 1672.
Jones, W. F., Jr. 2072, 3088.
Jordan, C. E., 3675.
Jordan, W. J., 1303.
Joseph, M. C., 3085.
Joubert, D. M., 251.
Joubert, L., 19, 675, 875, 999, 3831, 3837.
Jovanović, V. P., 1543.
Jowsey, J., 4083.
Jowsey, J. R., 1152.
Joyce, C. R. B., 4111.
Joyner, J. W., 334.
Joyner, L. P., 1407, 3924, 3929.
Juarez, F., 3102.
Juarez, W. J., 340.
Jubb, K. V., 1198. 1272.
Julian, L. M., 3304.
Julian, L., McK., 3753.
Jungerman, P., 2078.
Jungmichel, H., 3388.

Jungherr, E. L., 1346, 1789, 2143, 2135, 2136, 2137, 2138, 2272, 2379, 2877, 2878, 3182, 3299, page 750.
Justo, L. F. A., 2467.

Kabaev, K., 415.
Kádár, T., 2153.
Kaden, R. H., 2079.
Kadenatsii, A. N., 2921.
Kaeckenbeeck, A., 1357.
Kästli, P., 1703.
Kafel, S., 987.
Kaffka, A., 3533.
Kagan, I. G., 3641, 3642.
Kahlcke, A., 1350.
Kaiser, I. H., 3333.
Kaji, T., 3975.
Kakavas, J. C., 21.
Kakuk, T., 1046.
Kaldor, I., 853.
Kalikin, B., 1063.
Kalojanoff, A. I., 4130.
Kalugin, V. I., 1687.
Kamiya, S., 3049.
Kampelmacher, E. H., 1343, 3116.
Kaneko, I., 219.
Kaneko, J. J., 270.
Kaneko, T., 1054.
Kantorovich, R. A., 434, 753.
Kaplan, M. M., 2832.
Kaplan, W., 57, 418, 1023, 2444, 3532.
Karakašević, B., 1369.
Kapp, P., 3976.
Karasszon, D., 3199.
Karbainov, M. A., 1314.
Kare, M. R., 253.
Karib, A. A., 3535.
Kark, R. M., 531.
Karl, H., 4126.
Karlog, O., 794.
Karlson, A. G., 1324.
Karnovsky, M. L., 3033.
Karsai, F., 2055.
Karstad, L., 1775, 2124.
Karulin, B. E., 3981.
Kaschula, V. R., 2147.
Kassai, T., 814, 815, 816, 1126, 2208, 2918.
Kast, A., 495, 3651.
Kasza, L., 2054, 3880.
Kataoka, T., 3588.
Katić, R., 710, 1689.
Katić, V. R., 709.
Katsh, S., 2193.
Katsuta, H., 2166.
Katunarić, M., 1385.
Katz, L. N., 198.
Kauffmann, G., 1914, 2629.
Kaufman, B., 519.
Kauker, E., 437.
Kavanaugh, J., 3283.
Kawai, K., 2166.
Kawakami, Y., 3975.
Kawase, T., 3048, 3049.
Kayser, C., 1918.
Kazanskii, I. L. 2095.
Kchouk, M., 3744.
Keating, J., 2641.
Kechawarz, M. N., 4153.
Keeble, S. A., 3977.
Keefe, E. R., 2633.
Keegan, H. L., 2531, page 224.
Keeling, A. D., 194.
Keep, J. M., 568.
Keister, D. L., 3169.
Keith, R. K., 162, 1815, 3289.
Keith, T. B., 1535.
Kelch, F., 380.
Keller, H., 2071, 3812.
Keller, J. C., 2522.
Keller, N., 4079.
Kelley, G. W., 3286.
Kelley, R. W., 3306.
Kelly, B., 1073.
Kelly, C. F., 608, 3736.
Kelly, J. W., 194.
Kelly, S., 775.
Kemenes, F., 2054, 2055, 3515, 3880.
Kemkes, B., 3484.
Kemmerer, A. R., 1507.
Kempf, J. E., 2130.
Kench, J. E., 3717.
Kendall, K. A., 623.
Kendall, S. B., 734, 2376, 3929, page 110.
Kendrick, J. W., 1428, 2754.
Kennedy, C. C., 2113.
Kennedy, H. E., 3095.
Kennedy, P. C., 4041.
Kennington, M. H., 3675.
Kent, P. W., 3750.
Kent, S. P., 1498, 2594.
Kenzy, S. G., 705, 3301.
Keppie, J., 324, 3495.
Kerékjártó, B., 2127.
Kerékjártó, B. V., 2466.
Kernkamp, H. C. H., 3453.
Kershaw, G. F., 1066, 2247.
Kersting, G., 2466, 2488.
Keynes, R., 4104.
Khachatryan, A. B., 372.
Khaleque, K. A., 2098.
Khalimbekov, M. M., 670.
Khanbegyan, R. A., 4014.
Kibler, H. H., 589, 3397.
Kiddy, C. A., 3167.
Kidner, M., 3063.
Kidwell, J. F., 1964.
Kielwein, G., 655.
Kienel, G., 2940.
Kienholz, M., 3484.
Kiesel, G. K., 3514.
Kiggins, E. M., 2435, 2437.
Kiigemagi, U., 4009, 4010.
Kilchsperger, G., 2416.
Kilham, L., 2867.
Kimura, S., 219.
Kinard, R. F., 3092.
Kinast, F., 3769.
King, A. S., 258, 588, 3361.
King, E. O., 1883.
King, J. B., 2291.
King, J. T., 2597.
King, N. B., 1003, 3506, 3848
King, W., 2401.
Kingrey, B. W. 1634.
Kingscote, A. A., 2194.
Kinney, W. C., Jr., 3036.
Kirby, W. W., 3271.
Kirk, R. W., 2659.
Kirk, W. G., 2979.
Kirschner, L., 376, 706.
Kishi, S., 2141.
Kislitsina, L. I., 449.
Kiss, J., 181.
Kissling, R. E., 99, 100, 1421, 3942, 3944, 3951.
Kiszel, J., 3516.
Kitchell, R. L., 262, 3452, 3453.
Kitselman, C. H., 2834.
Kivalo, E., 259.
Kjems, E., 3082.
Klastrup, O., 3473.
Kleckner, A. L., 2608.
Kleiber, M., 270, 1516, 1522, 4058.
Klein, A., 1565, 1566.
Klein, H., 356.
Klein, N. W., 1503.
Klein, R., 3422.
Kliesch, J., 1296.
Kligman, A. M., 2081.
Klimov, A. F., 1294.
Klosterman, E. W., 3848.
Klotz, J., 3237.
Klussendorf, R. C., 3325.
Knapp, F. W., 3268.
Knecht, A. T., 2434.
Kneteman, A., 2063.
Knieriem, B. B., 1712.
Knight, G. J., 59.
Knill, L. M., 2189.
Knipling, E. F., 3616.
Knisely, M. H., 1597.
Knowles, C. B., 1519.
Knox, R., 1321, 2701.
Kobozieff, N., 2325.
Kobusiewicz, T., 3205, 3565.
Kobylinski, P. G., 2081.
Kochurin, A. I., 1007.
De Koek, G., 3934.
de Kock, W. T., 1525.
Köhler, H., 206, 553, 1143, 2968.
Koerber, W. L., 1760.
Kötsche, W., 429.
von Koetsveld, E. E., 3331.
Kohn, A., 440.
Kohn, H. I., 4051.
Kojnok, J., 1041, 2829.
Kok, J. C. N., 1257.
Kokernot, R. H., 3231, 3232.
Kokurichev, P. I., 1314.
Kolb, E., 197, 252, 3415.
Kolc, J., 2432.
Kolesov, S. G., 1307, 1308, 1309, 1662.
Kolman, J. M., 1423.
Kolobolotskii, G. V., 275, 276, 277.
Kolyakov, Y., 101.
Komarov, A., 409.
Komesu, N., 4073.
Komjáthy, K., 2203.
Kompantsev, V. A., 2308.
Kóňa, E., 1100, 1101.
Konishi, S, 1071.
Konno, K., 2729.
Konno, S., 161, 238.
Kono, R., 1456.
Kono, Y., 1424, 2859.
Konyukhov, M. P., 2109.
Konyukhova, V. A., 4114.
Koppang, N., 1947.
Koppel, Z., 4062.
Korn, G., 3207.
Kornberg, H. A., 4075.
Korngold, L., 2515.
Korych, B., 3592.
Korzh, P. M., 3649.
Koster, R., 1583.
Kostner, M., 2756.
Kotlan, A., 2905.
Kotlarova, H., 1704.
Kotter, L., 1347.
Kotula, A. W., 633.
Koula, V., 821
Koutz, F. R., 156.
Kovac, W., 3255.
Kovács, J., 4091.
Kovalenko, Y. R., 1379.
Köves, J., 2153.
Koyama, R., 1397.
Kowalczyk, T., 1767.
Kozić, L., 1567, 3725.
Kozicka, A., 998.
Koznov, N. A., 1678.
Kradolfer, F., 1792.
Kraft, L. M., 1074.
Kral, F., 3714.
Kramer, W., 2287, 3803.
Krasnow, I., 333, 339.
Kratzer, F. H., 540, 1521, 1532.
Kratzing, C. C., 3382.
Kraus, H., 395.
Krause, D., 1954.
Krauss, H., 4123.
Krauss, S., 3584.
Kraybill, H. F., 4044.
Krčméry, V., 41, 369, 1015, 3872, 3873, 3874, 3875, 3876, 3877.
Kréguer, A., 382.
Krehl, W. A., 3414.
Krishna Rao, C., 285, 1614, 1949, 2665.
Krishna Rao, N. S., 2385.
Kronauer, G., 2870.
Kroneman, J., 3656.
Krueger, H., 2361.
Kruglov, V. T., 2793.
Krull, W. H., 2202.
Krushchov, G. K., 1967.
Krutzsch, P. H., 1768.
Kryukova, I. N., 4042.
Krzywy, T., 2441.
Kubelka, V., 1090, 3592.
Kubota, Y., 1453.
Kucera, C. J., 1975.
Kuchel, R. E., 1216.
Kucherova, N. T., 1014.
Kuscera, G., 2019.
Kuebler, W. F., Jr., 1226.
Kühn, H., 660.
Kujumgiev, I., 1384, 2770.
Kuksis, A., 943.
Kullczycki, J., 2609.
Kuleshova, V. G., 3040.
Kulkarni, H. V., 2548.
Kulkarni, V. B., 2450.
Kulwich, R., 2958.
Kumagai, T., 238, 2859.
Kume, S., 1132, 1820.
Kummer, M., 126.
Kunin, C. M., 2481.
Kunkel, H. O., 3663.
Kunst, H., 1042.
Kunter, E., 1351, 2822.
Kuntz, R. E., 2533.
Kupferschmied, H., 1555.
Kurata, K., 109, 3588, 3589.
Kuretani, K., 922.
Kuroki, H., 1449.
Kurtanjek, I., 1439.
Kurtz, H., 3979.
Kurung, J. M., 2392.
Kurzeja, K., 42.
Kurzmann, R., 2729.
Kushner, D. S., 13, 14.
Kutas, F., 3412.
Kuwert, E., 2831.
Kvaal, M., 2020.
Kvasnitskii, A. V., 4114
Kyle, M. G., 2685.

Labie, C., 1729.
de Labonnefon, G., 731.
Labouche, C., 1240, 2315.
Lackman, D. B., 1010, 2048.
Lacroix, J. V., 646.
Ladell, W. S. S., 2617.
Ladwig, V. D., 1634.
Lämmler, G., 159.
Lagasse, A., 1939.
Lai, M., 2893.
Laing, J. A., 70.
Laird, M., 1408.
Lalich, J. J., 2295.
Lalitha, C. M., 2209.
Lamanna, C., 457.
Lambert, M. R., 1155.
Lambourne, L. J., 3062.
Lamming, C. E., 1969.
Lamond, D. R., 1266, 2360, 3785
Lampkin, G. H., 2321, 3063.
Lamson, A. L., 2135, 2138.
Lamy, L., 744.
Lancaster, W. E., 1493.
Lancefield, R. C., 322.
Landagora, F. T., 1151.
Landau, L., 1871.
Lane-Petter, W., 192, 1991.
Lang, R., 3210.
Lang, R. W., 3154.
Lang, W. R., 2692.
Langham, R. F., 1373, 2053, 3154, 3155.
Langham, W. H., 1896.
Langlade, M., 9.
Languillon, J., 3547.
Lannek, N., 2160, 3966.
Lantz, F. H., 540.
Lanz, E., 3781.
Lapčević, E., 1433.
Larenaudie, B., 1763, 3212.
Lari, F. A., 1408.
Larin, N. M., 149, 2318, 2861, 2863.
Laroche, M., 1109, 1124, 1437, 2875, 3596.
Laroche, M.-J., 1228.
Laron, Z., 3422.
Larrabee, W. L., 610.
Larsen, A. B., 6, 7, 2013.
Larsh, J. E., Jr., 480.
Larski, Z., 428, 2487.
Larson, B. L., 623.
Larson, C. L., 3602, 3836.
Larson, I. W., 1128.
Larsson, B., 3652.
Laruelle, L., 2930.
Lasmanis, J., 1995.
László, F., 2216.
Latner, A. L., 2278.
Lattimer, J. K., 972.
Lauder, I., 830.
Laurell, G., 3710.
Laurence, D. R., 3160.
Laurent, C., 1418.
Lavrent'ev, P. A., 3551.
Lawn, A. M., 1600.
Lawrence, J. H., 558.
Lawrence, J. S., 256.
Lawrie, R. A., 1943, 1944, 1945.
Lawson, G. T. N., 1393.

Lawson, K. F., 3489.
Lawson, W., 1957.
Layne, D. S., 4147.
Leach, B. F., 493.
Leader, R. W., 1784.
Lebailly, J., 820.
Lebeda, M., 823.
Leblond, C. P., 1864, 2573, 3032.
LeBouvier, G., 3602.
Lecomte, S., 1329.
Lee, C. P., 2597.
Lee, D. J., 1072.
Lee, C. G., 1444.
Lee, H. J., 239, 1216, 3678.
Lee, H. W., 2238.
Lee, K. M., 112, 1780.
Lee Chin Hua, 2549.
Leech, F. B., 1186.
Leeper, L. C., 2327.
Leeper, R. A., 57,
Van Leeuwen, G., 2515.
Leffel, E. C., 865.
Leftheriotis, E., 771.
Legates, J. E., 971.
Legg, M. A., 2952.
Lehký, F., 3883.
Lehmann, H., 2645.
Lei, G. M., 3800.
Leidl, W., 733.
Leinati, L., 1252.
Leiner, J. W. G., 2922.
Leise, J. M., 3142.
Leistner, W., 3089.
Leland, S. E., Jr., 1111, 1486, 1798, 4025.
Lemaire, R., 2558.
Lenert, T. F., 3391.
Lengemann, F. W., 201.
Lenihan, J. M. A., 4086.
Van Lennep, E. W., 916.
Lennette, E. H., 3953.
Lennon, H. D., Jr., 867, 1184.
Lépine, P., 1065, 1419.
Lerche, M., 968, 2815, 3504.
Leresche, E., 995.
Lerner, E. M., Jr., 1025.
LeRoux, P. L., 2720, 3625.
Lesser, E., 3927.
Lesslie, I. W., 2003.
Letroteur, R., 954.
Leunen, J., 3214.
Lev, M., 2230, 2782.
Levaditi, J.-C., 744.
Levchenko, I. D., 1006.
Leveille, G. A., 1847.
Lévêque, H., 2980.
Levi, I, 1807.
Levi, R. S., 2395.
Levina, E. N., 2001.
Levina, I. G., 1362, 1363.
Levine, H. B., 3487.
Levine, N. D., 1115.
Levine, P. P., 1078, 1447.
Levine, S., 2499.
Leviseur, S., 3099.
Levinson, S. A., 2061.
Lewert, R. M., 1809.
Lewin, Y., 236.
Lewis, C. J., 2312.
Lewis, C. N., 4103.
Lewis, D. G., 3172.
Lewis, E. F., 1283, 1883.
Lewis, G., 852, 2242.
Lewis, P. K., Jr., 2579.
Li, C. P., 1740.
Li, J., 2377, page 348.
Li, P. N., 1911, 2811.
Lichton, I. J., 2571.
Lieberman, S., 1464.
Liégeois, F., 3705.
Lienert, E., 2940.
Liesegang, 3654.
Liess, B., 3234.
Light, F. W., Jr., 3702.
Lightbrown, J. W., 2302, 2303.
Lillie, R. J., 3667.
Lim, K. A., 3581.
Lindahl, I. L., 2230, 2231.
Lindahl, J., 2146.
Lindemann, G., 1207.
Lindenmann, J., 446, 447, 448.
Lindorfer, R. K., 143.
Lindquist, D. A., 1578, 3620.
Lindsay, D. B., 3694.
Lindsey, D., 2434.
Line, C., 524, 2244.
Link, K. P., 3986.
Linkfield, R. L., 4012.
Linsert, H., 1608.
Linssen, H., 3.
Lipanowicz, J., 474, 3824.
Lipiński, W., 2017.
Liplich, L., 3932.
Lipsky, J., 2775.
List, R., 3836.
Littlejohn, A., 4064.
Littman, M. L., 3537.
Litwin, J., 146.
Liu, C. H., 2312.
Lively, D. H., 3086.
Livingston, A. L., 1577.
Livingston, C. W., 2145.
Ljujić, A., 1063.
Lockhart, W. R., 3446.
Lococo, S., 2426.
Lodenkämper, H., 2403.
Lodha, K. R., 3281.
Löliger, H. C., 1335, 2029.
Loftfield, R. B., 3760.
Loftus, T. M., 2798.
Loginov, V. P., 1731.
Logothetopoulos, J., 214.
LoGrippo, G. A., 2882.
Lombardo, N., 3054.
London, S. A., 1684.
Long, J. L., 1254, 3763.
Long, P. L., 1817.
Longhurst, 1136.
Van Loon, E. J., 4057.
de Loose, R., 1591.
Loosli, J. K., 188, 1513.
Loosmore, R. M., 2364.
Lord, L. H., 1636.
Lorenz, F. W., 1877.
Lorkiewicz, Z., 94, 1049.
Lorvik, S., 3741, 3761.
Losee, F. L., 2578.
Lotz, W. E., 2618, 2677.
Lough, S. A., 3336.
Louie, R., 93.
Love, G. J., 392.
Lovell, H. R., 3816.
Lovern, J. A., 1616.
Lowe, J. S., 2961, 2962, 2963.
Lucam, F., 2462, 3564.
Lucas, A., 1109, 1124, 1487, 2718, 2875, 3596.
Lucas, C .C., 2559.
Lucas, H., 679.
Lucas, I. A. M., 1154, 1514, 1526.
Lucas, J. J., 3783.
Lucas, J. M., 1516.
Lucas, J. M. S., 3922.
Luchini, R. M., 3184.
Ludford, C. G., 1422.
Ludvigsen, J. B., 2982.
Ludvík, J., 3577, 3938.
Ludwick, T. M., 614, 1613, 1948, 3766.
Ludwig, D. R., 1227.
Lübke, R., 1494, 2463.
de Lüchter, N. R. L., 2467.
Luecke, R. W., 564.
Lüttgau, H. C., 1932.
Luginbühl, H., 4160.
Luginbuhl, R. E., 1346, 1789, 2135, 2136, 2137, 2138, 2877, 2878.
Luick, J. R., 1516, 1522.
Luisenko, A. A., 163.
Lukin, L., 559.
Lumsden, W. H. R., 2527, 2855.
Lund, E. E., 3917, 3918, 4032.
Lundbaek, K., 3346.
Lundberg, A., 1373.
Lunde, M. N., 742.
Lundgren, D. L., 1305.
Lundvall, R. L., 2342.
Lurie, M. B., 2395.
Lusby, M., 3487.
Lush, J. L., 497, 1496.
Lusvarghi, E., 599.
Luther, H. G., 1581, 4053.
Lutsky, I., 1070.
Luttrell, C. N., 1059.
Lutynski, R., 1705, 2413.
Lutz, A., 580.
Lwoff, A., 1458.
L'vov, N. M., 1325.
Lyman, R. L., 1577.
Lynch, H. P., 720.
Lynch, J. E., 1399.
Lyne, A. G., 591.
Lynn, R. J., 1536.
Lyon, W., 2578.

Macadam, I., 1651.
McAnulty, E., 3115.
McBride, G., 3802.
McCabe, W. J., 3764.
McCance, I., 3401.
McCance, R. A., 593, 2589, 2591, 2592, 3754.
McCandless, E. L., 571.
McClain, M. E., 3567.
McClelland, G. A. H., 4002.
McClelland, R. B., 4043.
McClendon, J. F., 2936.
McClure, T. J., 423, 1630, 2935.
McClurkin, A. W., 761.
McClymont, G. L., 842.
McCollum, W. H., 772.
McConnell, W. C., 1210.
McCosker, P. J., 1086.
McCowen, M. C., 1137, 1495, 1569.
McCoy, J. R., 193.
McCrea, M. R., 389.
McCredie, J. A., 2946.
McCrory, B. R., 2852.
McDaniel, G. R., 4142.
McDiarmid, A., 1355, 2042, 3130.
MacDonald, A. M., 205, 2583.
Macdonald, E. M., 3647.
McDonald, I. R., 520, 3758.
McDonald, I. W., 1164.
MacDonald, L. E., 618, 1955, 3440.
McDonald, M. W., 534, 849, 2572.
McDonald, N. R., 2424, 3882.
MacDonald, R. E., 2075.
McDowall, F. H., 1160, 2228, 2229.
McEntee, K., 3055.
McErlean, B. A., 1665.
McEuen, G. L., 894.
McEwen, A. D., 1671.
Macfarlane, W. V., 2634.
McGeady, P. A., 4045.
McGee, G., 809.
McGillivray, W. A., 1160, 1161, 1868, 3682, 3683.
McGinnis, J., 2566.
McGowan, B., 517, 2852, 3149.
MacGregor, H. I., 1152.
MacGregor, K. L., 563.
McGregor, W. S., 153, 1802.
McGuire W. C., 3919.
Mach, P., 823, 824.
Machado, L. J. P., 1697.
McHugh, J. F., 3061.
McHugh, R. F., 3748.
McIndoe, W. M., 1250.
McIntosh, B. M., 1055.
McIntyre, W. I. M., 375.
Mack, R., 740.
Mackaness, G. B., 2642.
McKay, D. G., 3525, 3526, 3527.
McKay, G. W., 2355.
Mackay, J. M. K., 1756.
Mackay-Dick, J., 2771.
McKee, M. T., 2776.
McKenna, J. M., 147, 460, 2889.
McKenzie, B. F., 2000.
McKenzie, C. P., 3910.
McKenzie, D. A., 1845.
McKenzie, J. S., 2294.
McKercher, D. G., 1428, 2852.
McKercher, P. D., 2140.
Mackerras, M. J., 1107.
McKevett, M., 3288.
Mackowiak, C., 771 1764, 3210, 3564.
McLaren, A., 3022, 4140.
McLaren, D. S., 1850.
McLaren, J. R., 2304.
McLoughlin, D. K., 1749, 3916.
McLean, F. C., 2648.
McLean, J. W., 2346.
Maclennan, K. J. R., 729, 1645, 3271.
Macleod, W. G., 2848.
McLeod, W. J., 1398.
McLimans, W. F., 1975, 2562.
McLoughlin, D. K., 1749, 3916.
McMillen, S., 13, 14.
McNutt, S. H., 51.
MacOwan, K. D. S., 1985 2703..
McPherson, E. A., 1024.
Macpherson, I. A., 2835, 3111.
McQueen, R. G., 2367.
Madden, D., 3059.
Madden, P. A., 1753.
Maddy, K. T., 388, 3897, 3898.
Madejski, Z., 4093.
Madeyski, S., 1030.
Madin, S. H., 2698.
Madsen, H., 1112, 1123.
Madsen, K. A., 2254.
Madsen, M. A., 4059.
Maegraith, B., 1808.
Maestrone, G., 700.
Magalhães, L. M., 1200.
Magarey, F. R., 1242.
Magat, A., 151, 3564.
Maghami, G., 2764.
Magee, P. N., 573, 2220.
Magnani, G., 538.
Maglione, E., 3657.
Magner, J. M., 4036.
Magnus, H., 1365.
Maguire, F. S., 1256.
Maguire, T., 376, 706.
Mahadevan, P., page 418.
Mahaffey, L. W., 2970, 3779.
Mahlau, E., 98, 654.
Mahler, H. R., 2653.
Mahmoud, A. H., 82.
Mahnke, P.-F., 1361, 2021.
Mahrla, A., 1610.
Maim, H. M., 844.
Majno, G., 3033.
Makhinya, E. M., 1029.
Maki, L. R., 845.
Malek, E. A., 4038.
Málek, P., 2432.
Malewitz, T .D., 1746.
Malherbe, H., 3978.
Mali, L. page 684.
Málková, D., 3579.
Mal'tsev, S. V., 2105, 2106.
Mamatsashvili, E. G., 1016.
Mamedov, A. A., 1677.
Mamedov, D. M., 1502.
Mameesh, M. S., 4052.
De Man, T. J., 2257, 3342.
Mandahl-Barth, G., 798, 1103.
Mangan, J. L., 1842, 2938, 3661.
Manjrekar, S. L., 2450.
Mann, T., 611, 1260, 1616, 1624, 4132.
Mann, T R. R., 2686.
Manning, M. C., 3895.
Manninger, R., 2153.
Mannov, G. M., 1575.
Manocchio, J., 2968.
Mansfield, M. E., 1799.
Mansi, W., 445, 2866, 3603.
Mansjoer, M., 2144.
Månsson, I., 2799, 3112.
Månsson, J., 3066.
Mansvelt, P. R., 145.
Manthei, C. A., 726.
Mantovani, A., 130, 132.
Mantovani, G., 3476.
Manunta, G., 1185.
Manwell, R. D., 80, 404.
Maqsood, M., 2817, 3220.
March, B. E., 2689.
Marchette, N. J., 1305.
Marchwicki, R. H., 2056.
Marcinka, K., 1871.
Marden, W., 945.
Marek, K., 2495.
Mares, R. G., 1056, 2849.
Margaroli, D., 835.
Marinesco, G., 1451, 1452.
Markell, E. K., 3630.
Markiewicz, K., 881.
Markov, A. A., 313.
Marković, B., 1742.
Markovits, P., 2152.
Marks, J., 1669.
Marks, S., 176, 4075.

Markson, L. M., 857.
Marmion, B. P., 455.
Marquardt, W. C., 74, 1471, 3269.
Marr, A. G., 597, 4113.
Marsboom, R., 399.
Marsden, A., 2236.
Marsh, B. B., 4128.
Marsh, C. L., 1223, 2024.
Marshak, R. R., 543.
Marshall, I. D., 3593.
Marshall, J. H., 4083.
Marshall, S. C., 2459.
Marshall, S. P., 2941.
Marshall, V., 2851.
Marthedal, H. E., 76.
Marston, H. R., 3678.
Martig, R. C., 1948.
Marti-Ibañez, F., page 684.
Martin, L. E., 246, 523.
Martin, R. S., 2236.
Martin, W. B., 330, 483.
Martin, W. H., 1753.
Martinčić, M., 567.
Martini, F. V., 378.
Martini, I., 2977.
Martinovich, P., 3819.
Martins Mendes, A., 1026, 2084.
Marucci, A. A., 2119.
Maržan, B., 230, 788, 4092.
Marzulli, F. N., 1919.
Mascherpa, P., 130.
Maskar, U., 917.
Mason, R. W., 2361.
Masouredis, S. P., 562.
Masters, P. L., 1366.
Masyukov, A. V., 699.
Mastroianni, L., 2349.
Mathews, J., 2190, 4020.
Mathues, J. K., 1866, 1867 .
Matoltsy, A. G., 1246.
Matrone, G., 507, 2955.
Matson, W. E., 1231.
Matsushima, J., 1168.
Matthews, P. R. J., 319, 3604.
Matthias, D., 106, 3235.
Matumoto, M., 140, 427, 764, 1424, 1449, 1456, 2859, 3975.
Matthiesen, M., 464.
Matzke, H. A., 3519.
Maupoumé, R., 612, 3433.
Maurer, F. D., 2865.
Maurer, P. H., 1461, 2187.
Maurin, C., 266.
Maw, W. A., 4147.
Mawson, C. A., 3327.
May, A. J., 3521.
Mayer, H., 1011, 2738, 2759, 3143, 3144.
Mayer, K., 646.
Mayer, M. L., 3860.
Mayes, P. A., 220.
Maynard, L. A., 2590.
Mayne, Y. C., 2788.
Mayneord, W. V., 3370.
Mayo, R. H., 1527.
Mayr, A., 1048, 1064, 2157, 2158.
Del Mazza, I., 3216.
Mazzaracchio, V., 1765, 1766.
Mazurczak, J., 1853.
Meakin, L. R. P., 306.
Mebust, W., 3322.
Mechalas, B. J., 701.
Mederos, R., 1829.
Meduri, F., 1927.
Medrea, N., 2094.
Medway, W., 253.
Megale, F., 3436.
Meginnis, P., 548.
Mehnert, B., 1391.
Meier, H., 180, 862, 2111, 3362, 3363.
Meier, K., 1196.
De Meillon, B., 3231, 3232.
Meinershagen, W. A., 1382.
Meites, J., 1590, 1639, 2967.
Melampy, R. M., 1267.
Melanidi, C., 3821.
Melcer, I., 3059.
Melczer, N., 181.
Meldrum, G. K., 9125.
Meléndez, V., L., 407.
Mellors, R. C., 436, 1085.
Melly, M. A., 2744.
Melrose, D. R., 712, 1719, 2064.
Melton, M. L., 1036.
Melville, C., 4007.
Memmel, H., 3739.
Menčiková, E., 2739.
Meneely, G. R., 2293.
Menges, R. W., 392, 3885.
Menon, P. B., 65.
Menšík, J., 37.
Merdivenci, A., 3623.
Merilan, C. P., 3037, 3345, 3374.
Merkal, R. S., 6, 2013.
Merrick, J. V., 1319.
Mesároš, E., 3965.
Meschia, G., 2671.
Messerli, W., 2390.
Metcalf, J., 2671.
Metcalfe, R. L., 1647, page 224.
Metcalfe, S. N., Jr., 3086.
Mettler, E. A. J., 3102.
du Metz, J. M., 2828.
Meyen, J., 3755.
Meyer, H., 260, 3056.
Meyer, M .E., 2757.
Meyer, R. K., 942.
Meyer, 942.
Meyers, R. A. J., 4004.
Meyn, A., 994, 1360, 2388, 3088, 3823.
Meynard, J.-A., 1916.
Meynell, G. G., 988.
Mialhe, P., 2646.
Michael, R. P., 3778.
Michalska, I., 2083.
Michel, J. F., 166, 1816, 2914.
Michels, H., 2866.
Michi, M., 2920.
Michie, D., 3022, 4140.
Michna, S. W., 1711.
van Middlesworth, L., 1876.
Międzobrodzki, K., 792, 887, 2904.
Mierzejewska, J., 3502.
Mierzejewska, M., 3236.
Mihailov, M., 1474.
Mihajlović, B., 1.
Mihajlovic, S., 2486.
Mihăiță, S., 1430, 1432.
Mikhail, T., 2289.
Mikhailov, N. A., 1307, 1308, 1309, 1364.
Miklovich, M., 4091.
Mikulaszek, E., 3492.
Milaković, L., 3853.
Milanović, N., 103.
Miles, A. A., 379, 3893, 3894.
Miles, E. M., 3894.
Millar, M. J., 3327.
Millard, R. A., 1281.
Millen, J. W., 2251.
Miller, B. F., 4071.
Miller, R. C., 3376.
Milller, R. F., 1559, 2996.
Miller, V. A., 52.
Miller, W. C., 611, 3365.
Miller, W. J., 3036.
Miller, W. S., 4129.
Millot, P., 2320.
Mills, C. F., 4088.
Milne, F. J., 1891.
Milner, K. C., 1692.
Milstrey, R., 536.
Milunović, M., 36, 295, 3818.
Miner, M. L., 3921.
Mingle, C. K., 1696.
Minuse, E., 2481.
Mirial, G., 2718.
Misra, B. G., 737.
Mitchell, C .A., 3244.
Mitchell, D., 3513, 3590.
Mitchell, J. S., 2926.
Mitchell, K. G., 1517, 2248, 2565.
Miteff, G., 2169.
Mitscherlich, E., 3234.
Mixner, J. P., 595, 866, 867, 938, 1184.
Miyazaki, Y., 2166.
Mizuno, N. S., 2615.
Mlinac, F., 3486.
Mochmann, H., 1361, 2021.
Möhlmann, H., 18.
Møller, F., 3797.
Moeller, M. W., 1177.
Mølmen, K., 2020.
Mohiyuddeen, S., 2385
Moinuddin, J. F., 2238.
Moir, R. J., 1852.
Mole, R. H., 1895.
Moles, A., 1485.
Molinari, P., 2787.
Molinari, V., 3626.
Moll, T., 1057.
Molle, J., 2601, 2602.
Moller, K., 2381, 2684.
Mollison, P. L., 3065.
Molomut, N., 3480.
Mondini, S., 693, 708, 3531, 3746.
Monie, I. W., 1537.
Monlux, A. W., 4039.
Monlux, W. S., 1634.
Monroe, R. E., 1473.
Monsur, K. A., 2098.
Montemagno, F., 1794, 2221.
Monteverde, J. J., 26.
Monti, F., 2007.
Monty, K. J., 4088.
Moody, M. D., 3479.
Moon, H. D., 908.
Moore, B., 27.
Moore, C. D., 2939.
Moore, E. N., 557, 569.
Moore, F. J., 1322.
Moore, L. A., 243.
Moore, N. W., 941.
Moore, R. O., 2454.
Moore, R. W., 3254.
Moore, T., 532.
Moore, W., 1845.
Moosbrugger, G. A., 2118, 3203, 3204.
Mora, A., 4066.
Moraillon, P., 116.
Moran, A. B., 344, 2748.
Moraru, E., 2025, 2094.
Mordasov, P. M., 2103.
Morehouse, G. L., 1693.
Morehouse, N. F., 3910.
Moreira, H. A., 1530, 3321.
Moretti, B., 751.
Morgan, A., 4082.
Morgan, A. T., 3718.
Morgan, C. L., 674, 1907, 3189.
Morgan, T. B., 860
Morgan, W. J. B., 712, 1719, 2064.
Morgantini, F., 2356.
Mori, H., 2536.
Morimoto, T., 427, 764, 1449.
Moriconi, A., 3741, 3761.
Morita, S., 234.
Moritsch, H., 3255.
Mornet, P., 1454.
Moro, S. M., 1188.
Morris, D., 3379.
Morris, E. J., 2789.
Morris, I. G., 1797, 3608.
Morris, M. J., 6.
Morris, R. J. H., 2634.
Morris, T. R., 840.
Morrison, R. A., 948.
Morrison, S. M., 35, 396.
Morse, E. V., 341, 1373, 2053, 3154, 3155.
Morter, R. L., 1373, 3155.
Morton, D. D., 869.
Morton, H. E., 1739, 2369.
Morton, R. A., 2961, 2962, 2963.
Morton, R. K., 3025.
Moryakova, O. I., 2045.
Moses, M. J., 2322.
Moses, M. R., 1732.
Mosier, H. D., 2585.
Moskowitz, M., 3886.
Moss. M. L., 3752.
Motchashi, T., 2141.
Motsavage, M. A., 2081.
La Motte, L. C., Jr., 2473.
Mould, D. L., 3559.
Moulder, J. W., 3969.
Moule, G. R., 953.
Moulton, J. E., 1715, 2086, 2757, 2927, 2976, 3304.
Mount, L. E., 1181.
Mounter, L. A., 3719.
Mountney, G. J., 1574.
Moussa, R. S., 3887.
Moustgaard, J., 2256.
Mouton, R. P., 3576.
Movsesyan, T. B., 1333.
Moyer, A. W., 2133.
Mraz, F. R., 4060.
Muckenthaler, J. M., 208.
De Muelenaere, H. J. H., 3774.
Mueller, A., 1462, 1463.
Mueller, A. P., 3607.
Müller, J., 688, 1691, 3499.
Müller, K., 790.
Münker, W., 3131.
Muftic, M. K., 335.
Muggenthaler, K., 3007.
Muhlethaler, J. P., 3422.
Muhrer, M. E., 3306. 3328.
Muir, R. W., 625.
Mukherjee, A., 649.
Mukherji, A., 2387.
Mulargia, A., 2007.
Mullaney, P. E., 1156.
Mullenax, C. H., 1214.
Mullins, J., 3358.
Munch, T., 2593, 3341.
Munch-Petersen, E., 1157, 3541.
Mundt, J. O., 3859.
Mundt, W., 2778.
Munro, D. A., 2176.
Mura, D., 1998, 3905.
Murányi, F., 3855.
Murat, P., 2422.
Murnaghan, M. F., 2201.
Murnane, D., 4069.
Murphree, R. L., 1512.
Murphy, L. C., 2056, 2057.
Murphy, T., 2743.
Murphy, W. H., Jr., 652.
Muschel, L. H., 2751.
Mussett, M. V., 2302, 2303.
Mussgay, M., 3566.
Muth, O. H., 2948.
Muto, S., 1054.
Myalo, I. I., 2110.
Myktowycz, R., 435, 475, 1096.
Mylrea, P. J., 3330.
Myrvik, Q. N., 3828.
Myuller, G. R., 1602.

Nadel, M. K., 1786.
Nabholz, A., 1312.
Nagler, M., 264.
Nai, D. D., 3475.
Nakagawa, M., 3814.
Nakai, M., 1071.
Nakamura, H., 109, 3588, 3589.
Nakamura, J., 2141, 2846, 2847.
Nakamura, M., 1528.
Nakamura, R., 219.
Nalbandov, A. V., 2357.
Naletov, N. A., 328.
Namioka, S., 2032.
Nani, S., 650.
Narasinga Rai, B., 3091.
Nardi, E., 3622.
Nasr, S., 2380.
Nassal, J., 2391, 3830.
Nath, V., 289.
Nathans, D., 1854.
Nay, T., 3406.
Nayudu, C. S., 946.
Nazarov, V. A., 88.
Neal, J. E., 2174.
Neal, R. A., 3021.
Neave, F. K., 4.
Nechinennui, D. K., 1911.
Neel, W. W., 1092.
Neenan, M., 1861.
Neess, J., 1462.
Neff, B. J., 3953.
Neher, G. M., 1675, 3838.
Neimann-Sørensen, A., 939, 3797.
Neitz, W. O., 2902, 3554, 3935.
Nelson, A. J., 3731.
Nelson, M. M., 1537.
Nelson, W. A., 2199.
Nelson, W. O., 397, 519, 4152.
Nemeséri, L., 3463, page 280.
Nermut, M. V., 348.
Nes, N., 3789.
Nešić, P., 1567, 3725.
Neter, E., 2031.
Netter, A., 2708, page 109.
Netter, R., 96, 97.
Neuman, V., 1561.

Neumann, H.-J., 1350.
Neumark, C., 236.
Nevenić, V., 81.
Newberne, J. W., 466, 770, 3202.
Newberne, P. M., 581, 894, 2252.
Newcombe, H. B., 883.
Newing, C. R., 58.
Newman, H. J., 3457.
Newmann, A. L., 1523.
Newsam, I. D. B., 2682.
Newsome, J., 3624.
Nicander, L., 934, 2674.
Nicholas, D. J. D., 1175.
Nicholas, W. L., 3646.
Nichols, J. E., 3810 page 55.
Nichols, R. E., 512, 514.
Nickel, H., 2403.
Nickerson, W. J., 242, 3536.
Nicol, L., 3968.
Nicol, T., 1230.
Niedergerke, R., 1932.
Nielsen, H. M., 2288.
Nielsen, K., 3346.
Nielsen, N., 725.
Niemczycka-Węgrzyn, S., 3319.
Niemegeers, K., 66.
Niesar, K.-H., 1961.
Niggli, H. B., 2741.
Nihleen, B., 3057.
Nikiforov, N. I., 604.
Nikolić, B., 103, 1433.
Nikolitch, M., 412.
Nikoloff, P., 1400.
Nikol'skii, S. N., 2810.
Nilakantan, P. R., 2498.
Niléhn, P.-O., 2799, 3087.
Nilsson, G., 1654, 1655, 1656, 1657.
Nilsson, T., 3472.
Nisbet, A. M., 549.
Nisbet, D. I., 552.
Nishida, S., 234.
Nishikawa, Y., 2681.
Nitzschke, E., 419.
Niven, J. S. F., 63, 3601.
Nixon, D. A., 1585.
Nižnánsky, F., 41, 369, 1015, 1084, 1646, 3147, 3867, 3872, 3873, 3874, 3875, 3876, 3877.
Noble, R. L., 1849.
Nóbrega, P., 1292, page 109.
Nomura, Y., 1453.
Noonan, T. R., 1557.
Norambuena G., M., 407.
Nordland, O., 3244.
Norman, G. R., 3664.
Norman, L., 173.
Norman, M. J. T., 1095.
Norris, K. R., 1094, 4004.
Norton, H .W., 1523.
Norton, S., 1489.
Notzold, R. A., 1177.
Novara, V., 3380.
Novický, R., 30.
Novinskaya, V. F., 2096.
Nowak, R., 2987.
Noyes, H. E., 23.
Noyes, R. W., 4136.
Noyes, W. F., 436.
Nozaki, H., 1942.
Nujdin, N. I., 4151.
Numans, S. R., 2266.
Nunes Petisca, J. L., 2217.
Nuñez, F. C., 3571.
Nuñez Martinez, E., 1829.
Nusshag, W., 280.
Nyiredy, I., 990, 3815.
Nyström, G., 1328.

Oakley, C. L., 592.
Obel, N., 3066.
Oberling, C., 500.
Obiger, G., 1986, 2383.
O'Brien, E., 2505.
O'Brien, J. D. P., 2795.
Ochs, M. J., 203.
O'Connor, D., 3704.
O'Connor, L. K., 1879.
O'Dell, B. L., 1838, 2252.
Odermatt, J., 944.
O'Flaherty, F., 634.
Ofúkaný, L., 3867.
Ogneanov, D., 2389.
Ogonowski, K., 3130.
O'Gower, A. K., 1072.
O'Grady, B., 1822.
O'Grady, F., 2442.
O'Hara, P. B., 533.
Ohbayashi, M., 161.
Ohder, H., 890.
Ohishi, I., 1132.
Ohms, J. I., 3432, 3770.
Ohshima, K., 496.
Okazaki, K., 115.
Okuneva, L. E., 452.
Okuneva, V. V., 2485.
Oláh, P., 2154, 2164.
Oldfield, J. E., 2948, 2954.
Olds, D., 286, 622, 1621.
Olesuik, O. M., 3181.
Olitzki, A. L., 3510, 3878.
Olivant, J. M., 1251, 3034.
Oliver, J., 4.
Oliver, W. T., 563.
Olley, J., 1616.
Olomucki, E., 1898.
Olsen, L. S., 3286.
Olsen, M. W., 3407.
Olson, B. H., 3165.
Olson, J. C., Jr., 2749.
Olson, L. E., 2288.
Olson, N. O., 1262, 2176, 3907, 3908, 3909.
Olsson, S.-E., 1315, 2688.
O'Meara, D. C., 3174.
O'Moore, L. B., 1861, 2947.
Omori, T., 427, 764, 1449, 3975.
Oncioiu, P., 1326.
Ono, H., 496.
Ono, T., 1652, 4068.
Oparin, P. G., 4017.
Oppenheimer, E. H., 3377.
Oppermann, R., 397.
Orbell, W. G., 149, 2861.
Orfei, 1765, 1766.
Orfila, J., 2451.
Orhan, A., 3070.
Oriot, E., 1228.
Orlans, E. S., 2470.
Orlić, N., 3858.
Orlov, N. P., 2215.
Orlova, N. N., 88.
Ormsbee, R. A., 3602.
Ortega, L. G., 1085.
Ortega, P., 2300, 2625.
Orten, J. M., 3059.
Osaki, H., 3318.
Osamura, K., 2491.
Osawa, E., 2751.
Osborn, O. H., 3183, 3188.
Osborne, A. D., 389.
Osborne, H. G., 1086, 3357.
Osebold, J. W., 1331, 2813.
Oshio, Y., 2537.
Ošmarin, P. G., 4017.
O'Steen, W. K., 951.
Ostertag, H. G., 2759.
Ostertag, W., 4149.
O'Sullivan, J. F., 666.
O'Sullivan, J. G., 391.
Ösz, G., 2153.
Ott, R. L., 431, 769.
Ott, W. H., 77, 402.
Otta, J., 2841.
Ottaway, C. W., 532.
Otte, B., 3560.
Otto, G. F., 1750.
Otto, H., 4125.
Ottosen, H. E., 2973.
Owen, E. C., 215.
Oyaert, W., 3353.
Ozawa, Y., 3137.
Ožegovic, L., 1392.

Packchanian, A., 66.
Packett, L. V., Jr., 3663.
Paertan, J., 3413.
Pagano, J. F., 1390.
Pakhotin, V. Y., 1007.
Pal'gov, A. A., 1396.
Palgrave, J. A., 840.
Pallaske, G., 3845.
Pallesen, D., 901.
Palmer, A. C., 2483.
Palmer, D. F., 418.
Palmer, I. S., 2290.
Palmer, J. B., 2333.
Pálsson, P. H., 426.
Pamukcu, A. M., 1139.
Paneblanco, F., 2200.
Panetsos, A., 2806.
Panjević, D., 119.
Pankevicius, J. A., 678.
Pant, C. P., 3620.
Pantelouris, E. M., 963.
Papachristophilou, P., 802.
Papparella, V., 2221.
Papworth, D. S., 1899.
Paraf, A., 2826, 2890, 3212, 3213, 3562.
Pardee, A. B., 716.
Paredes, J. R., 2253.
Paredis, F., 2779.
Parez, M., 711, 3011.
Parfitt, J. W., 2532, 2914, 3990.
Paris, R., 3408.
Parisot, T., 769.
Parker, A., 4051.
Parker, H. E., 3681
Parker, R. C., 1978.
Parker, W. H., 489.
Parkes, A. S., 615.
Parks, J. J., 3223.
Parlett, R C., 2399.
Parnas, J., 94, 998, 1049, 2418, 3502.
Parr, W. H., 857, 1170.
Parrish, H. M., 2296.
Parsons, J., 1928.
Pasher, I., 2965.
Pasley, F., 3594.
Passey, R. D., 2220 .
Pasternak, C. A., 3750.
Pasti, C., 3684.
Patchell, M. R., 2228, 2229.
Pate, D. P., 2608.
Patel, U. G., 3403.
Patella, R. F., 3102.
Paterson, A. B., 658, 2004, 2012.
Paterson, H. E., 3231.
Paterson, J. S., 1836.
Paterson, J. Y. F., 545.
Paterson, R. A., 1878.
Patočka, F., 2739, 3592.
Paton, W. D. M., 248.
v. Patow, C., 1296
Patrick, H., 1533, 2580, 4060.
Patrick, S. J., 3727.
Patsko, L. V., 452.
Pattanyak, S., 494.
Patten, B. M., 4163, page 622.
Patterson, E. L., 536.
Patterson, J. L., 3416, 3417.
Patterson, T. B., 3437.
Patterson, W. C., 127, 430.
Pattison, I. H., 319, 347, 1653, 1997, 2148.
Patty, R. E., 408, 1413.
Paturi, S., 2498.
Paul, G. W., 2281.
Paul, I., 2281.
Paul, W. M., 2611, 3418, 3419.
Paunović, S., 651, 1434.
Pavlik, L. G., 2324.
Pavlov, P., 730.
Pavlov, V. A., 1960.
Pavlović, D., 1771.
Pavlović, O., 1433.
Pawson, H. C., 1297, page 56.
Pay, T. W. F., 1040, 2121.
Payne, F. E., 3979.
Payne, J. M., 2784.
Payne, K., 1088.
Payne, L. C., 1155.
Payne, L. F., 4142.
Payne, R. W., 3838.
Payne, W. J. A., 2365.
Pazur, J. H., 1587.
Pchelkina, A. A., 3981.
Pearce, J. H., 2186, 3983.
Pearce, K. A., 955.
Pearce, R. H., 605.
Pearson, A. E. G., 2836.
Pearson, H. E., 1419.
Pearson, J. K. L., 1660.
Pearson, P. B., 2958, 4088.
Peck, E. F., 1187.
Peck, F. B., Jr., 3012.
Peckham, M. C., 1446.
Peebles, T. F., 1642.
Peeters, G., 1591, 3353.
Pegreffi, G., 3864, 3905.
Pehl, K.-H., 122, 2857.
Peirce, A. W., 1165.
Peizer, L. R., 1320.
Pekerman, S. M., 2033.
Pelczar, M. J., Jr., 3168.
Pellett, P. L., 1520.
Penikett, E. J. K., 2701.
Penn, K., 512, 514.
Penn, N., 462.
Pennell, R. B., 2188.
Pennington, R. J., 3426.
Pensack, J. M., 3325.
Penso, G., 3888.
Peoples, D. M., 1739.
Perdue, H. S., 1750.
Pereira, H. G., 1073.
Perek, M., 24, 3722.
Perepechaev, A. N., 2814.
Perez Gallardo, F., 2832.
Pérez-Tamayo, R., 2393.
Perkins, A. G., 126.
Perlasca, M., 225.
Perlstein, Z., 2924.
Perman, V., 2615, 4089.
Perrin, D. D., 1905, 1906.
Perrin, D. R., 1844.
Perry, K. D., 2088.
Perry, S., 256.
Persaud, B. R. B., 2545.
Personeus, G. R., 378.
Perus, 2818.
Petek, M., 672, 3598.
Peters, T., Jr., 3323.
Petersen, G. B., 1182.
Petersen, W. E., 1588.
Peterson, H. O., 2197.
Peterson, K., 405.
Peterson, K. J., 3704.
Peterson, W. D., Jr., 2471.
Petrović, K., 984.
Petrovitch, Ž., 738, 3197.
Pette, J., 2488.
Pfander, W. H., 3306, 3328, 4161, page 684.
Pfister, R., 3257.
Phaneuf, L. P., 1936.
Phease, R. N., 3130.
Philips, F. M., 155.
Philips, F. S., 4096.
Philipson, L., 3710.
Phillips, G. D., 2321.
Phillips, P. H., 1121, 1559, 2996, 3282.
Phillips, M. G., 2316.
Phillipson, A. T., 539, 1244, 1295, 1531, 1933, 4046, page 109.
Phung Van Dan, 3837.
Piccotin, G., 3354.
Pichugin, L. M., 5, 101.
Pick, R., 198.
Pickering, J. F., 1498.
Pickett, B. W., 3037.
Pickett, E. E., 3328.
Pier, A. C., 1395, 2797.
Pieracci, F., 3528.
Piercy, S. E., 59, 111.
Pieresca, G., 2903.
Pierotti, P., 4013.
Pierre, M., 871.
Pietryk, H. C., 2185.
Pilet, C., 1454.
Pilipenko, M. E., 1241.
Pillemer, L., 1499.
Pilz, W., 1702, 3001.
Pini, A., 2880.
Pink, A. N., 1744.
del Pino, M., 2467.
Pipes, G. W., 542, 3693.
Pires, A., 3016, 3698.
Pirt, S. J., 306.
Pisano, M. A., 3537.
Pital, A., 3142.
Pitt-Rivers, R., 2328.
Pitzschke, H., 3943.
Pivnyak, I. G., 364.
La Placa, M., 2007.
Placidi, L., 413, 746.
Planterose, D. N., 3743.
Plastridge, W. N., 2435, 2437.
Platt, B. S., 2942, 4048.
Platt, H., 3940.
Pleva, V., 969, page 55.
Plowright, W., 110, 2796, 2885.
Plumlee, M. P., 1527, 3675.

Plzak, L. F., 1929.
Pobisch, R., 3058.
Podhorský, J., 1108.
Podleski, T. R., 2189.
Podliachouk, L., 2520, 3609.
Pogosyan, A. A., 372.
Pogue, J. P., 3296.
Pokidov, I. I., 2810.
Pojer, J., 2845.
Pokorný, B., 3883.
Pokorný, J., 2429.
Polhill, R. D. A., 3273.
Polin, D., 77, 896.
Poljak, V., 974.
Polkhovskii, F. Y., 1004.
Pollak, J. K., 1129.
Pollard, C. B., 2296.
Pollard, C. J., 2600.
Pollard, E., 778, 2502.
Pollard, M., 2869.
Polley, J. R., 1050.
Polony, R., 4062.
Polson, A., 90.
Polyakova, O. A., 1670.
Pomales-Lebrón, A., 2040, 2755.
Pomanskaya, L. A., 1709.
Pomeroy, B. S., 141, 143, 891, 2711, 3183, 3188, page 418.
Pomriaskinsky-Kobozieff, N., 2325.
Poncet, 999.
Poncet, G., 3563.
Ponomarenko, V. V., 4155.
Ponziani, G., 132.
Poole, H. K., 3407.
Poore, W., 1931.
Pop-Cénitch, S., 3197.
Pope, A. L., 1121, 3282.
Popescu, A., 1327.
Popov, A., 2906.
Popov, V. I., 1330, 3843.
Popovici, I., 2129.
Popp, L., 2010.
Popper, H., 2378, page 109.
Porter, C. C., 77.
Porter, D. A., 3637.
Porter, J. W. G., 1517.
Porter, K. A., 914.
Porterfield, I. D., 1262.
Portway, B., 510.
Possehl, C. D., 2305.
Post, J., 1565, 1566.
Potel, K., 2821.
Potoček, M., 1277.
Potter, B. J., 1180.
Potter, M. D., 4097.
Poulik, M. D., 2651.
Poulsen, E., 2285, 2299.
Pounden, W. D., 1999, 3084, 3848.
Powell, A. K., 2836.
Powell, E. O., 2368, 2789.
Powell, M., 853.
Power, J. H., 3523.
Powers, D. K., 3157.
Prachoff, R., 4141.
Prati, G., 708.
Pratt, S. D., 3084.
Prelipceanu, G., 1326.
Premachandra, B. N., 542, 3693.
Prescott, B., 1914, 2629.
Presnall, C. C., 1416.
Prestidge, L. S., 716.
Preston, R. D., 1021.
Preston, T. R., 1971.
Preuss, H., 2772.
Prévot, A. R., 2433, page 280.
Pribilla, W. F., 3322.
Price, E. K., 1883, 2699.
Price, K. E., 1581, 3892.
Price, W. H., 3223.
Prichard, M. M. L., 3421.
Pridham, T. J., 3556.
Priest, S. G., 268.
Priestley, F. W., 60, 2448.
Prigge, R., 1287, page 56.
Prince, A. M., 1076, 1442.
Pritchard, W. R., 570, 1427, 1556, 3229, 3959.
Probine, M. C., 3764.
Prohászka, L., 997, 3136, 3855.
Prokhorov, A. V., 2398.
Prouty, R. L., 3790
Provost, A., 2175, 2449, 3219, 3904.
Prudentov, N. A., 1004.
Pryor, W. J., 1089.
Pryse-Davies, J., 3372.
Prystowsky, H., 2671.
Psychoyos, A., 920.
Pudelkiewicz, W. J., 3376.
Pugh, P. D. S., 217.
Puhač, I., 710, 1689.
Pun, C. F., 4148.
Purmalis, A., 3384.
Purohit, M. S., 918, 3281.
Pustovar, Y. P., 3649.

Quaglio, G., 662, 3531.
Quarterman, J., 2321, 3063.
Quesada, A., 3856, 3857, 3971.
Quevedo, J. M., 3102.
Quevedo, W. C., Jr., 2637.
Quicke, G. V., 3774.
Quinchon, C., 980, 1039.
Quinlan, J., 869.
Quiroz, C. A., 2508.
Quisenberry, J. H., 1574.
Qureshi, S. H., 1685, 3775.

Raby, C., 4157.
Rac, R., 390, 671.
Radeleff, R. D., 154, 242.
Radford, H. M., 935.
Radley, J. M., 3370.
Radojčević, M., 1771.
Radomiński, W., 102, 1776.
Răducănescu, H., 2025.
Raettig, H., 777, 3808, page 622.
Rafaelsen, O. J., 3346.
Raffel, S., 311.
Raggi, L. G., 1077, 1444.
Raghavachari, K., 676, 2513.
Raghavan, N. G. A., 494.
Ragozina, M. N., 1602.
Ragsdale, A. C., 3296, 3399, 3735, 4105.
Rahman, M. H., 830.
Rahman, M. M., 2599, 2951.
Raica, N., 1507.
Rainey, J. W., 3679, 3699.
Raitt, K., 745.
Rake, G. W., 1760, 1975, 2562.
Raker, C. W., 572.
Rakes, J. M., 1267.
Rakovec, R., 738.
Raleigh, R. J., 4059.
Ramakrishnan, M., 653.
Rampton, C. S., 3226.
Ramsey, F. K., 1426, 1634, 2850.
Ramsey, H. A., 507.
Ranalli E. 1760.
Randall, C. C., 108, 3956.
Randall, J. B., 2373.
Rangneker, P. V., 2604.
Rankin, J. D., 2732, 2736.
Ranney, A. F., 1313.
Rao, S. B .V., 673.
Rappaport, C., 1974.
Rasbech, M. O., 4150.
Rasmussen, F., 1580.
Raspi, E., 2007.
Ratalics, L., 3963.
Ratcliffe, H. L., 1319
Rathová, V., 3579.
Ratner, M., 93.
Rauchbach, K., 3285.
Raun, E. S., 1470, 1800, 3267.
Ravaioli, L., 1765, 1766.
Rawes, D. A., 2915, 2916.
Ray, A. P., 737.
Raynaud, M., 2433.
Read, C. P., 400.
Read, M. S., 4044.
Reagan, R. L., 2465.
Reber, E. F., 2606.
Receveur, R., 3587.
Record, B. R., 2697.
Reculard, P., 3968.
Reczko, E., 2125.
Redaelli, G., 680, 717, 2792.
Reddy, A. M .K., 676, 2513.
Redmond, H. E., 1755.
Reed, R. E., 3898.
Reed, W. C., 2633.
van Reen, R., 212, 2578.
Reenaas, R., 2112.
Rees, K. R., 884.
Rees, O., 3178.
Rees, R. J. W., 3835.
Rees, T. A., 349.
ap Rees, W., 913.
Reese, P., 3819.
Reeves, W .C., 2474, 2475, 2840.
Refelson, M. E., Jr., 3221.
Regan, W. O., 1838.
de Regel, N., 1228.
Rehder, K., 1578.
Rehfeld, C. E., 4089.
Rehm, W., 84, 3135.
Reibel, S., 1463.
Reid, A. F., 2883, 2884.
Reid, B. L., 858, 2587, 2599, 2951, 3176.
Reid, C. S. W., 1158, 1159, 1160, 1841, 2228, 2229, 2938, 4046.
Reid, J. T., 1237.
Reid, R. L., 1162, 1163, 2569.
Reid, R. S., 539.
Reid, W. M., 2608, 3644, 3902, 4012.
Reiffel, L., 531.
Reina-Guerra, M., 3884.
Reineke, E. P., 1833.
Reinhard, E. G., 3628.
Reis, J., 1292, page 109.
Reiss, J., 332.
Reitsma, P., 2257.
Reklitis, S., 2768.
Renault, L., 19.
Rendel, J., 2191.
Rendtorff, R. C., 1814.
Renold, A. E., 1538.
Renoux, G., 1012, 1013, 1706, 1707, 1708, 2052, 2761, 3145, 3146, 3511, 3871.
van Rensburg, S. W. J., 927, 3076, page 480.
Renzoni, A., 1952, 3741, 3761.
Rerat, A., 2601, 2602.
Reumont, M., 2930.
Reuss, U., 2874.
Reusse, U., 38, 3138.
Revo, M. V., 1793.
Reyniers, J. A., 1467, 3711.
Reynolds, I. M., 2423.
Reynolds, M., 3416, 3417.
Reynolds, S. R. M., 2611, 3418, 3419.
Reynolds, W. M., 4053.
Režek, A., 4118.
Rezvuikh, A. I., 415.
Rhcins, M. S., 782.
Rhoades, H. E., 2034.
Rhodes, D. N., 1848.
Ribelin, W. E., 1414, 4037.
Ribi, E., 3836.
Rice, C. E., 87, 463, 3513.
Rice, E. G., 4057.
Rice, V. A., 971.
Rice, W. G., 493.
Rich, G. B., 1805.
Richardson, M., 2051.
Richardson, U. F., 2376, page 110.
Richert, D. A., 526.
Richey, D. J., 674, 1907, 3189.
Richou, R., 980.
Richter, C. P., 2585.
Richter, G., 2627.
Richter, J., 2827, 2837.
Richter, J. H. M., 139.
Richter, K., 2683.
Richter, W., 1342.
Rickard, C. G., 882, 1447.
Rickard, H. E., 614, 1613, 3766.
Ricq, A., 133.
Riehl, L. A., 3277.
Riek, R. F. 162, 1815, 3288, 3289.
Van Riel, J., 1374.
Van Riel, M., 1374.
Rieth, H., 2080, 3533.
Rievel, H., 968.
Rigdon, R. H., 2613, 3003, 3176.
Rigopoulos, N., 1683.
Rikimaru, M. T., 3923.
Rimington, C., 2364.
Ringer, R. K., 1595.
Rippon, J. E., 647.
Rising-Moore, F., 466.
Rislakki, V., 1772.
Ristic, M., 1720, 1722, 1752, 2065, 2107, 2108, 2766, 3161, 3229, 3959.
Ritchie, H. E., 576.
Ritter, D. B., 3602.
Ritzerfeld, W., 2035.
Rizzo, H. R., 3102.
Roan, C. C., 3268.
Robbins, W. E., 473, 1572.
Roberson, R. H., 1529, 3680.
Roberts, D. S., 719, 3113, 3522.
Roberts, F. H. S., 3288, 3633.
Roberts, G. B. S., 330.
Roberts, G. Fulton, 644, page 56.
Roberts, I.H., 1799.
Roberts, N. F., 1234.
Roberts, R. E., 1166.
Roberts, S. J., 421, 1629, 3349.
Roberts, V. S., 1921.
Robertson, A. G., 3617.
Robertson, J. M., 552.
Robertson, P. A., 1922.
Robertson, W. G., 866, 867, 1184.
Robertstad, G. W., 53.
Robinson, G. L., 22.
Robinson, J. F., 2771.
Robinson, J. R., 1505.
Robinson, M. A., 3065.
Robinson, T. J., 941.
Robinson, V. B., 466, 770, 3202.
Roborgh, J. R., 3342.
Robson, J. M., 10, 937.
Robson, M., 1465
Robson, M. J., 2943.
Robson, W. 220.
Roby T. O., 1753.
Rocha, H., 3854.
Rockborn, G., 1068, 1069.
Rodbard, S., 516.
Roddy, W. T., 634.
Rode, C. P., 3014.
Rodriguez, C., 3036.
Rodriguez y Feliz, M. D., 578.
Rodriguez, J. L., Jr., 3277.
Rodriguez Loustau, J. A., 3102
Rodriguez T., R., 407.
Röhrer, H., 410.
Van Roekel, H., 3181, 3184.
Van Roekel, O. K., 3390.
Roepke, M. H., 366, 992, 2090, 2619, 3861.
De Roever-Bonnet, H., 1035.
Rogalski, L., 40.
Roger, A., 2149, 3256.
Roger, F., 2149, 3256.
Rogers, B. S., 1894.
Rogers, D. E., 2744.
Rogers, E. B., 3748.
Rogers, H. J., 4120.
Rogers, R. L., 2297.
Rogers, T. A., 1516, 3316.
Rohde, B., 2127, 2466.
Rohde, R., 1345.
Romer, O., 3473.
Rolle, M., 1391, page 622.
Romano, A. H., 3536.
Romanova, V. P., 450.
Romanowska, M., 582.
Romboli, B., 2218, 3700.
Romváry, J., 993, 3962.
Ronaldson, J. W., 3052.
Roncalli, R., 583.
Rook, 2758.
Rook, J. A. F., 524, 1832, 2244, 2565.
Root, W. S., 559.
Roots, E., 1081, 2022, 3847, 3974.
Rosaschino, F., 2792.
Rose, A. L., 1980.
Rose, B., 3260.
Rose, C. L., 574.
Rose, J., 4030.
Rose, M., 612.
Rose, W. K., 671.
Rosen, M. N., 2813.
Rosenberg, E. E., 892.
Rosenberger, C. R., Jr., 3246.
Rosenberger, G., 1091, 2419, 2978.
Rosenblum, E. D., 1457.

Rosenfeld, G., 2279, 2327, 4074.
Rosenfeld, I., 237.
Rosenthal, H. L., 193.
Roško, L., 1494.
Ross, J. F., 3323.
Ross, J. M., 323.
Ross, K. A., 549.
Ross, M. A., 678.
Rossdale, P. D., 2970, 3779.
Rossi, C., 2880.
Rossi, P., 870, 3150, 3151.
Rossou, J., 1962.
Roth, A .R., 152.
Roth, E. E., 1712 .
Roth, N. G., 3086.
Roth, W., 83.
Rothschild, 1615.
Rothschild, M., 1288.
Rothstein, F., 2188.
Rotov, I. V., 363, 996.
Rott, R., 419, 1081, 3974.
Roulston, W. J., 4004, 4008.
Rousseau, M., 1979.
Roux, L., 1352.
Le Roux, P., 3621.
Rowatt, E., 3465, page 348.
Rowell, J. G., 932, 2565, 4135.
Rowland, M .E., 1814.
Rowland, R. E., 4083.
Rowland, S. J., 524, 2244.
Rowlands, I. W., 1618.
Rowley, I., 606, 925.
Rowsell, H. C., 2972, 3103, 3488.
Rowson, L. E., 291.
Rowson, L. E. A., 1624, 2666.
Roy, J. H. B., 1833, 4050.
Roznowski, E. P., Jr., 2123.
Rubel, H., 1733.
Rubin, H., 2170.
Rubin, R., 1743, 1749.
Rudge, J. M., 2424, 2430, 3882.
Ruebner, B., 2304, 3245.
Rukavina, J., 1482, 1807.
Rummel, A. G., 4017.
Runnells, R. A., 120, 1746.
Ruppert, H. L., Jr., 909.
Rusoff, L. L., 1151.
Russeff, C., 2169.
Russell, R. R., 3153, 3378.
Russell, R. S., 1203.
Russell, W. O., 3297.
Russomanno, R., 809.
Rust, R. E., 1639.
Ruth, H. J., 2891.
Rutqvist, A. L., 1304.
Rutqvist, L., 1344, 2037, 3119.
Ryabashev, P. A., 1004.
Ryan, F. B., 707.
Ryan, M. A., 2743.
Rydel, S., 1875.
Ryff, J. F., 1332, 1545.

Saar, C., 1225.
Sabathier, J., 2558.
Sabban, M. S., 1044.
Sabina, L. R., 639.
Sacco, T., 3954.
Sachs, L., 1273.
Sackmann, W., 1354.
Sacquet, E., 1012, 1707, 1708, 2406, 2761.
Sadler, W. W., 781.
Sadun, E. H., 173.
Sadusk, J. F., Jr., 1002.
Säring, H., 2405.
Safarov K. M., 374.
Safford, J. W., 3075.
Saile, J. L., 1762.
Sainte-Marie, G., 3032.
St. George-Grambauer, B. M., 232.
St. Vincent, L., 908.
Saison, R., 3987.
Sakaki, K., 669.
Sakamoto, T., 219.
Sakazaki, R., 2032.
Salaman, M. H., 92, 2220.
Sale, E. E., 268.
Salenstedt, C. R., 2860.
Salerno, G., 177.
Salisbury, G. W., 930, 931, 1611, 2663.
Salisbury, R. M., 1823, 2267, 2620, 2621, 3118, 3358, 3378.
Salmi, T. J., 1968.
Salmon Legagneur, E., 255.
Samborski, A., 71.
Samborski, Z., 1140.
Sampson, J., 618.
Samuel, I. McA., 1671.
Sanders, D. A., 1720, 1722, 1752, 2107, 2766, 3161.
Sanders, F. K., 1082.
Sanders, P. C., 1893.
Sanderson, W. W., 775.
Sandground, J. H., 809.
Sandvik, O., 2020.
Sanford, J. P., 23, 3903.
Sang, J. B., 3544.
Sanger. V. L., 569, 1398, 3020, 3438, 3786, 3848.
Santamarina, E., 2650.
Santmyer, P. H., 4036.
Santolucito, J. A., 4121.
Sarapato, J., 3824.
Sarkar, S., 131.
Saroff, J., 1185.
Sarwar, M. M., 806.
Sasahara, J., 115, 2859.
Sasaki, N., 1071.
Sasaki, S., 3186.
Saslaw, S., 3900.
Sato, T., 140.
Satriano, S. F., 2135, 2136, 2137, 2138.
Saunders, C. N., 1889.
Saunders, H. L., Jr., 938.
Saunders, L. Z., 557, 3373.
Sautter, J. H., 2615, 4089.
Savard, K., 4144 .
Sávay, G., 4087.
Savi, P., 3429.
Sawyer, M. T., 1331.
Sbarra, A., 2729.
Scarisbrick, R., 45, 217.
Scarnell, J., 2915, 2916.
Scatozza, F., 2171, 3045.
Scatterday, J. E., 2296.
van der Schaaf, A., 2414, 3503.
Schacher, J. F., 1819.
Schaedler, R. W., 978, 979.
Schäfer, W., 783, 1438, 2476, 2500.
Schaffer, J. D., 228.
Schaffner, F., 2378, page 109.
Schaffrath, J., 3685.
Schaible, P. J., 1529, 2557, 3680.
Schales, O., 950.
Schaller, O., 261.
Schalm, O. W., 1995, 3820.
Schambye, P., 1589.
Schang, P. J., 1761.
Schapira, G., 2994.
Scheel, A., 292.
Scheele, R., 3701.
Scheibner, G., 2772.
Scheidy, S. F., 1017, 1371.
Scheiner, A., 3501.
Schellenberg, D. B., 3519.
Schellner, H., 3134.
Scherer, R. K., 1999, 3080.
Schermer, S., page 750.
Scheu, O., 1011.
Schiemann, E., 3456.
Schindler, R., 38, 89, 209, 3135.
Schirren, C., 2080.
Schlegel, H.-L., 124.
Schleiter, H., 4065.
Schliesser, T., 994, 2388, 3088.
Schlossman, S., 2728.
Schlumberger, H. G., 2550, 3451.
Schmahlstieg, R., 911.
Schmid, D. O., 1360.
Schmidt, B., 1728.
Schmidt, D., 106.
Schmidt, D. A., 564.
Schmidt, E. G., 4051.
Schmidt, G. H., 3352.
Schmidt, J., 1296.
Schmidt, L., 1578.
Schmidt-Hoensdorf, F., 481.
Schmidt-Nielsen, B., 3318, 3425.
Schmittle, S. C., 3379.
Schmitz-Hillebrecht, E., 3001.
Schnappauf, H., 3366.
Schneider, A. P., 1535.
Schneider, B. H., 530.
Schneider, P., 386.
Schneider, P. A., 327, 2262.
Schneider-Pungs, K., 3088.
Schneierson, S. S., 1301.
Schnelle, G. B., 862.
Schnitzerling, H. R., 4004.
Schoder, H., 3046.
Schoenaers, F., 1357.
Schönberg, F., 967, page 110.
Schoental, R., 573.
Schofield, B. M., 293, 4146.
Schooley, J. C., 201.
Schoolman, H. M., 887.
Schoop, G., 2881.
Schreiber, J., 512, 514.
Schrinner, E., 2388.
Schrinner, E. J., 1360.
Schroeder, M. A., 2943.
Schroeder, R. J., 3074.
Schürmann, E., 826, 3573.
Schützler, H., 3002.
Schultz, L. H., 3351, 3352.
Schultze, A. B., 598.
Schultze, M. O., 2615, 4089.
Schulz, K. C. A., 3548.
Schulz, L.-C., 3655.
Schulze, W., 2783, 2857, 2987, 3002.
Schumacher, E., 3308.
Schumacher, H. H., 209.
Schuntner, C. A., 4008.
Schuster, E., 2722.
Schutte, J. R., 3548.
Schwab, J. H., 1302.
Schwartz, E. E., 1466.
Schwartz, R., 2957.
Schwartz, S. O., 837.
Schwarz, A. J. F., 114, 1778, 3227.
Schwarz, J., 1733, 3171.
Schwarz, K., 537.
Schweiger, L. B., 2091.
Schwöbel, W., 2156, 2157.
Schyns, P., 2507.
Scott, E. M., 2016.
Scott, G. R., 123. 128, 1062, 2845, 2848, 3226, 3958.
Scott, H. M., 1177.
Scott, I. W., 3798.
Scott, J. A., 3647.
Scott, M. L., 537, 1147.
Scott, P. P., 191.
Scott, R. F., 214.
Scotti, T. M., 3298.
Scott-Wilson, H. W., 1286.
Scragg, J. N., 3160.
Scrivani, R. P., 2474, 2475, 2840.
Scrivner, L. H., 1382.
Seadale, E. H., 443, 2168.
Searle, M., 2265.
Sebek, Z., 3883.
Sebetić, Č., 103.
Sebruyns, M., 1939.
Sedlmeier, H., 1347.
Seekles, L., 2257.
Seele, W., 3650.
Seelemann, M., 406, 1986.
Seeliger, H. P. R., 3840.
Seetharaman, C., 759.
Segal, S. J., 4152.
Seger, C. L., 3313.
Seguin, D., 2590.
Sehon, A. H., 3260.
Seibert, F B., 2009, 2400.
Seibert, M. V., 2009.
Seibold, H. R., 2678.
Seidel, G., 687.
Seiden, R., 4161, page 684.
Seiferle, E., 267.
Seigneur, J., 4075.
Sekariah, P. C., 685.
Seki, T., 1054.
Sellim, M. K., 819.
Sellers, A. F., 3757.
Sellers, K. C., 532, 2795.
Sellers, R. F., 2122.
Selye, H., 1218, 1901
Semar, R., 1390.
Semellini, L., 3200.
Sen, M. C., 1027.
Sen. R., 1338, 1339 1340.
Senaca, H., 972, 3544.
Senderi, M., 14.
Sendral, R., 3150.
Seneviratna, P., 2209, 4031.
Senger, C. M., 75.
Sen Gupta, B. R., 659.
Senk, L., 2843.
Sen'kov, Y. A., 1468.
Senze, A., 71, 3817.
Serafin, C., 40.
Serdyuk, S. I., 698.
Sergeev, V. A., 1356.
Serra, A., 3198.
Serrão, U. M., 1762.
Serý, V., 1881.
Seth, R. N., 677, 685.
Setinski, Z., 295.
Setnikar, I., 3414.
Sevast'yanova, N. A., 3006.
Sever, J. L., 1323.
Sevoian, M., 1078, 3252, 3253.
Sferco, A., 2343.
Shaffer, M. F., 1692.
Shakolov, K. I., 3729.
Shalash, M. R., 4139.
Shalduga, N. E., 2308, 3649.
Shalkop, W. T., 7.
Shanahan, G. J., 1088, 2523, 3995.
Shanberge, J. N., 3526.
Shanklin, M. D., 4107.
Shanks, P. L., 2254.
Shannon, P., 3764.
Shannon, R., 354.
Shapiro, N. I., 4151.
Shapiro, S. S., 3525, 3526, 3527.
Sharaf, A., 2289, 4145.
Sharma, G. K., 737.
Sharma, U. D., 1258.
Sharman, G. A. M., 205, 2583.
Sharonov, Y. A., 1008.
Sharpless, G. R., 2224, 2931.
Shaw, J. C., 544, 865, 2230.
Shaw, R. A., 515.
Shay, H., 2553.
Shcherbakov, E. V., 169.
Shcherbatuikh, P. Y., 1431.
Shea, G. J., 3892.
Sheahan, M., 2276, 4099.
Sheffy, B. E., 2851.
Sheldon, W. H., 3896.
Shellabarger, C. J., 2328.
Shelton, D. C., 2176, 3907, 3908, 3909.
Shelton, D. F., 2132.
Shelton, G. C., 1485, 4036.
Shen, P. M., 88.
Shenstone, F. S., 3430.
Shepard, C. C., 667, 2518.
Sheriff, D., 3196.
Sherman, J. K., 928.
Sherman, W. C., 4053.
Shetlar, C. L., 3838.
Shetlar, M. R., 3838.
Shibata, F., 3668.
Shilliam, K. W. G., 4050.
Shimizu, H., 910, 922, 1941.
Shimizu, K., 2491.
Shimizu, T., 1424, 1456, 2859.
Shinozaki, K., 4047.
Ship, A. G., 1854.
Shipkowitz, N. L., 3184.
Shipley, B. A., 3719.
Shively, J. N., 4076.
Shklyaev, I. P., 415.
Shmulevich, A. I., 1409, 3550.
Shneerson, A. G., 1803.
Shope, R. E., 1781, 2484.
Shorland, F. B., 2570, 3423.
Short, B. F., 3404.
Short, R. V., 611, 3051.
Shoshan, A., 3728.
Shrimpton, D. H., 4129.
Shroder, J. D., 3307.
Shuey, E. W., 1587.
Shugar, D., 4156.
Shulman, A., 903.
Shultz, F. T., 4078.
Shumard, R. F., 832, 1031, 1113, 1274, 1748, 3282, 3923.
Shupe, J. L., 2288, 4059.
Shute, E., 3793.
Shy, G. M., 1649, page 109.
Sibalić, S., 81.
Sichert, H., 2021.
Sieburth, J. McN., 689, 1349.
Siegel, B. V., 756.

Siegert, R., 437.
Siegmann, O., 3109.
Sier, A. M., 3522.
Sigurdsson, B., 426, 2023.
Sikes, D., 1675, 3839.
Sikora, A., 1667.
Sikov, M. R., 1557.
Silberberg, M., 3707, 3708.
Silberberg, R., 3707, 3708.
Silich, V. A., 454.
Siller, W. G., 621.
Silliker, J. H., 3121.
Sillioc, R., 2433.
Da Silva, N. P. M., 3493.
Silver, B. S., 513.
Silver, I. A., 2926, 3742.
Silver, M., 3759.
Silverberg, R. J., 2509.
Silverman, M. S., 387, 2616.
Silverstein, E., 1025.
Silvestrini, D. A., 2657.
Simić, C., 81.
Simitch, T., 738, 3197.
Simintzis, C., 3093.
Simmons, B., 2573.
Simon, J., 51, 1215, 1902, 3819.
Simonella, P., 132.
Simonnet, H., 1289, page 56.
Simonović, B., 1689.
Simonsen, M., 3264.
Simonson, M., 2603.
Simpson, C. F., 2876, 2917, 2929.
Simpson, H. R., 4001.
Simpson, J. E. V., 1903.
Simpson, R. W., 2504.
Sims, F. H., 2561.
Šimůnek, J., 4019.
Sinclair, A. N., 385.
Sinclair, D. P., 1903.
Singh, G., 659.
Singh, R., 3345.
Sinha, S. K., 3249.
Sinkovics, J., 136, 1443.
Sipka, M., 56.
Sippel, W. L., 1730, 2108.
Siragusa, F., 1925, 1926, 1927, 3445.
Sironi, A., 694.
Siu, 1589.
Sizemore, J. R., 3667.
Skalinskii, E. I., 2735.
Skaller, F., 2989.
Skerman, K. D., 1080, 1524.
Skillen, R. G., 3691.
Skipper, H. E., 184.
Škoda, R., 1045, 1047, 1075, 3948, 3949, 3950, 3972.
Škrabalo, Z., 739.
Skulski, G., 1406, 1659, 2861, 2862.
Skurski, A., 2039.
Slanina, L'., 766.
Slater, T. F., 3743.
Slee, J., 3792.
Slinger, S. J., 2656.
Smart, K. L., 1305.
Smith, A. H., 2274, 4112.
Smith, A. N., 3513.
Smith, B. F., 1067.
Smith, C. E., Jr., 1798.
Smith, C. N., 2522.
Smith, C. R., 336, 1322.
Smith, C. W., 3479.
Smith, D. L. T., 2292.
Smith, D. M., 1275.
Smith, D. W., 3096.
Smith, E. L., 2066.
Smith, E. M., 120.
Smith, F., 2891.
Smith, H., 324, 1664, 3478, 3495, 4086.
Smith, H. A., 959, page 56.
Smith, H. R., 2426, 3020, 3084, 3848.
Smith, H. Williams, 32, 33, 3832.
Smith, J., 861, 1170.
Smith, J. C., 2357.
Smith, J. D., 4121.
Smith, J. E., 3851.
Smith, J. P., 246, 523, 2250.
Smith, J. V., 1782.
Smith, L. D., 1716.
Smith, L. D. S., 3158.
Smith, P. F., 1739, 3186.
Smith, R. E., 2423.
Smith, R. G. C., 1970.
Smith, R. H., 1169.
Smith, R. N., 3361.
Smith, S. E., 528, 3673.
Smith, T. C., 632.
Smith, V. F., 1518, 3768.
Smith, V. R., 613, 616, 864, 921.
Smith, W. M., Jr., 141.
Smith, W. W., 392, 2992.
Smithcors, J. F., 1298, page 56.
Smither, A. M., 2747.
Smithies, O., 2651.
Smollich, A., 1248, 1604.
Smorodintsev, A. A., 780.
Smrček, Z., 668.
Smyth, C. N., 305.
Smyth, J. D., 2535.
Smythe, R. H., 2710, page 418.
Sneath, P. H. A., 2076, 2077.
Snell, J. F., 2630.
Snell, W. H., 2375, page 348.
Snook, L. C., 1176.
Snowball, G. J., 3274.
Snyder, E. S., 2656, 2657.
Soběslavský, O., 2512.
Sobey, W. R., 458, 467, 785.
Sobiech, T., 3824.
Sobotka, H., 2965.
Sobra, K., 1191, 1192.
Søgnen, E., 3431.
Soekawa, M., 2491.
Sondergaard, E., 2172.
Sorensen, B., 3473.
Sorensen, P. H., 2256, 2605.
Sohler, A., 3536.
Sohrab, V., 2764.
Sojka, W. J., 2747.
Sokol, A., 1306.
Sokolić, A., 1771.
Sokolova, V. I., 1688.
Soliman, F. A., 3756.
Solnitzky, A., 2268.
Soloshenko, I. Z., 2058.
Soltys, M. A., 1402.
Somers, M., 1934.
Soni, B. K., 2326.
Sonoda, M., 219.
Sopers-Jurgens, M. R., 1247.
Sorensen, D. K., 1767.
Sotiriu, E., 2059.
Soto-Figueroa, E., 3828.
Soulsby, E. J. L., 479, 484, 1133, 1488, 1818, 2547, 2887, 4033.
Southam, C. M., 1499.
Southcott, W. H., 3310.
de Souza, R., 1239.
Sova, Z., 231, 836.
Sovinová, O., 3577.
Spalatin, J., 1775.
Spandorf, A. A., 80.
Speck, J., 2721.
Spector, W. G., 3050.
Spedding, C. R. W., 165, 166, 1825, 2540.
Speirs, R. S., 2516.
Spicer, G. S., 3334, 4082.
Spink, W. W., 1725, 3509.
Spitzer, G., 725.
Splitter, E. J., 398, 1028.
Spörri, H., 944, 3715.
Sprague, M. A., 610.
Sprehn, C. E. W., 958.
Sprent, J. F. A., 3643.
Springer, G. F., 4162, page 480.
von Sprockoff, H., 757, 2139.
Sprowls, R. G., 4009.
Spuhler, V., 3204.
Spurrier, W., 837.
Sredović, S., 657.
Sriramachari, S., 3317.
Stade, K., 2627.
Stafseth, H. J., 343
Stagnara, P., 1937.
Stahl, P. R., 3411.
Stamatin, L., 2129.
Stamatin, N., 1663, 2025, 2026.
Stamler, J., 198.
Stamm, D. D., 99, 100, 1421.
Stamp, J. T., 2482, page 55.
Stanca, M., 1310, 1430.
Standen, O. D., 2915.
Stanecki, J., 2441.
Stanier, R. Y., 311.
Stanivuković, M., 1478.
Stankiewicz, W., 881.
Staples, E. L. J., 1823, 2620, 2621, 3378.
Staśkiewicz, G., 582.
Staub, H., 2881.
Stauber, L. A., 193.
Stebbins, M. R., 129.
Steel, R. G. D., 3041.
Steele, J. H., 2766, 3885.
Stefanović, Ž. M., 1440.
Stefánski, W., 2873, 3284.
Steffen, J., 20.
Stehbens, W. E., 1242.
Stehlik, Z., 2404.
Stellmacher, W., 357.
Stelzner, H. D., 2613.
Stemler, F. W., 3748.
Stephen, L. E., 3910.
Stephens, D., 2362.
Stephens, D. F., 2333.
Stephens, J. F., 1404, 2808.
Stephenson, B. J., 3677.
Stephenson, C. F., 3005.
Stephenson, M. L., 504.
Sterk, V., 984.
Stern, H., 2.
Sternberg, S. S., 4096.
Sterne, M., 377, 3108.
Stetson, C., Jr., 2728.
Steuer, H., 868.
Stevens A. J., 1543.
Stevens, K. M., 147, 460, 2185, 2889.
Stewart, A., 1879.
Stewart, D. F., 2440, 4024.
Stewart, D. G., 505.
Stewart, D. L., 712, 1719, 2064.
Stewart, G. A., 3374.
Stewart, P. B., 2134.
Stewart, R. C., 2113.
Stewart, R. E., 4107.
Stewart, R. J. C., 2942.
Stewart, T. B., 4026.
Sticinsky, E., 3627.
Stiles, F. C., Jr., 366, 992, 3861.
Stinebring, W. R., 2040, 2755.
Stob, M., 1148.
Stock, C., 1547.
Stocker, B. A. D., 988.
Stoebbe, E., 1376.
Stöhr, P., 18.
Stoenner, H. G., 1010, 2048.
Stoican, V., 1432.
Stokes, E. J., 1727.
Stokes, J. L., 989.
Stokstad, E. L. R., 536.
Stol'nikov, V. I., 1880.
Stolze, F., 15.
Stolzenbach, F. E., 212.
Stone, B. F., 2528.
Stone, C. A., 531.
Stone, S. S., 2182.
Stone, W. H., 3986.
Stone, W. M., Jr., 812.
Stonyer, E., 2233.
Storer, J. B., 1893, 1894.
Storey, E., 263, 2050.
Storozheva, A. M., 1492.
Storti, E., 599.
Storz, H., 3561.
Stošić, N., 103, 1433.
Stott, G. H., 864, 921.
Stoufer, R. M., 678.
Stover, B. J., 4079.
Stowe, C. M., 901.
Stower, J., 2658.
Strahan, E., 784.
Straiton, E. C., 1264.
Stratton, J., 2699.
Stratton, K., 2786.
Strauch, D., 1001, 2022.
Strauss, J., 1881.
Stricker, F., 1019.
Strogov, A. K., 2734.
Strohmaier, K., 2489.
Stromberg, M. W., 262, 3452, 3453.
Stroud, J. W., 1237.
Strout, R. G., 1738.
Struglia, L., 2958.
Stryszak, A., 2128, 3236.
Stuart, E. E., 126.
Stuart, P., 2008.
Stuart, R. C., 2233.
Stubbs, R. K., 2800.
Stünzi, H., 2924.
Stützel, M., 3412.
Stula, E. F., 2435.
Sturkie, P. D., 207, 1595, 2644, 4099.
Sturman, I. I., 1005.
Sturtevant, F. M., 1224.
Suarez, F. P., 579.
Subrahmanyan, T. P., 2833.
Suchanová M., 2739.
Sudia, W. D., 99, 100, 416.
Sugie, T., 2681.
Sugimori, T., 140.
Sugimura, K., 669, 3975.
Sukhomlinov, B. F., 1882.
Sulitzeanu, D., 3510, 3878.
Sulkin, S. E., 1457, 1768.
Sullivan, D. J., 1787.
Sullivan, F. M., 10.
Sullivan, J. J., 3454.
Sullivan, L. W., 632.
Sulzer, A. J., 3557.
Summa, H., 370.
Sumner, F. W., 2877, 2878.
Sund, J. M., 1215, 1902.
Sunde, M. L., 2237.
Supperer, R., 3993.
Supplee, W. C., 2588.
Surgenor, D. M., 2188.
Sury, A., 428.
Surynek, J., 822, 824.
Sussman, O., 3951.
Suter, P., 2595.
Sutherland, A. K., 1524.
Sutherland, F. B., 1355.
Sutmöller, P., 1343.
Sutter, M. D., 1806, 3017.
Suttie, J. W., 1559, 2996.
Sutton, M., 2620.
Suzuki, Y., 2767.
Sveberg, O., 1947.
Svedmyr, A., 2146.
Svet-Moldavsky, G. J., 3988.
Svet-Moldavskaya, I. A., 3988.
Swahn, O., 1171, 1304, 2037.
Swan, J. B., 202, 1903.
Swanson, L. E., 812, 2917.
Sweatman, G. K., 4006.
Swenson, C. B., 1675, 3838.
Sykes, G., page, 750.
Sykes, J. A., 3297.
Sykes, J. F., 2676.
Symons, L. E. A., 482.
Sypowicz, D. A., 2630.
Szabó, I., 47, 2151.
Szabó, J., 3963.
Szabó, de Bucs, E., 3164.
Szaflarski, J., 2487.
Szakmáry, G., 1046, 3947.
Szanto, P. B., 837.
Szczygielska, J., 94, 1049.
Szemerédi, G., 2054.
Szent-Iványi, M., 2067, 2827.
Szent Iványi, T., 47.
Szewczyk, J., 1875.
Szita, J., 2750.
Szkilnik, S., 3565.
Szovátay, G., 3901.
Szurman, J., 2487.
Szwabowicz, A., 792, 2904.

Tacu, D., 1736.
Täubrich, F., 3191.
Taga, M., 2126.
Tait, A. R., 707.
Tajima, M., 1453.
Tajima, Y., 1397.
Takanami, M., 3137.
Takaoka, 2166.
Takematsu, M., 115.
Takemoto, K. K., 2509.
Takos, M. J., 2213
Talanti, S., 259, 1601, 3029.
Talavera, J., 2910.
Talbert, G. B., 1958.
Talbot, C. D., page 348.
Talbott, G. D., 2377.
Talmage, D. W., 2893, 2894.
Talman, E. L., 641.
Tamate, H., 603.
Tamchyna, J., 1090.
Tanabe, Y., 1942.

Tancous, J. J., 634.
Tandon, R. S., 2534.
Taneja, G. C., 2309.
Tapernoux, A., 151.
Tarasevich, I. V., 453.
Tarazona Vilas, J. M., 227.
Tarlatzis, C., 2806.
Tarshis, I. B., 4028.
Tatrishvilli, P. S., 3383.
Tatum, H. W., 2030, 2742.
Tauxe, W. N., 1862.
Tavernier, H., 961.
Tay, J., 2206
Taylor, B., 1640.
Taylor, D. B., 570, 1556.
Taylor, D. C., 2985.
Taylor, E. L., 2532.
Taylor, E. P., 4097.
Taylor, J. R., 1512.
Taylor, M. W., 575, 3457.
Taylor, N. H., 1856.
Taylor, R., 2697.
Taylor, R. B., 1540.
Taylor, W. I., 3121.
Taylor, W. W., 1940.
Teague, H. S., 1948.
Teer, P. A., 804.
Teichmann, J., 2774.
Teige, J., 2690.
Telenkov, P. F., 449.
Tello Garust, A., 1348.
Temesi, Z., 3963.
Tempelis, C., 1462, 1463.
Tempelis, C. H., 3607.
Tempest, D. W., 1664.
Tenney, R. I., 701.
Tennille, N. B., 1888.
Tepper, B. S., 3139.
Tepper, I., 750.
Terekhov, P. F., 178.
Terent'ev, F. A., 313.
Tereshchenko, I. K., 1318.
Terhaar, C. J., 3268, 3287.
Ternan, P. R., 1964.
Terp, P., 2593, 3341, 3473, 3686.
Terplan, G., 1347.
Terpstra, J. I., 3568.
Terriere, L. C., 4009, 4010.
Terry, R. J., 68, 1741.
Tessmer, C. F., 4077.
Testi, B., 3500.
Teunissen, G. H. B., 2162.
Teuscher, E., 2005, 2907.
Teuscher, R., 1564.
Textor, K., 2644.
Thakaral, B. M., 673.
Thal, E., 1344. 1694, 3119.
Thamm, H., 3386.
Thanassi, F. Z., 2630.
Thapar, G. S., 157.
Theiler, M., 1774.
Thiel, W., 3483.
Thieme, E., 2270.
Thienpont, D., 3645.
Thier, L., 2913.
Thiersch, J. B., 272, 273.
Thimann, K. V., 310.
Thörne, H., 1650, 2715, 3078, 3079, 3813.
Thomas, A. D., 145, 2902.
Thomas, A. J., 3726.
Thomas, B., 1167.
Thomas, B. A. C., 483.
Thomas, G. J., 3559.
Thomas, J. H., 1020, 3163.
Thomas, L., 683, 684.
Thomas, L. J., 2213.
Thomas, P. L., 485, 1822, 3276, 3610, 3611.
Thomas, R. C., 781.
Thomas, V., 2866.
Thomasson, R., 3708.
Thompson, C. R., 1577.
Thompson, H. J., 609.
Thompson, J. F., 4128.
Thompson, J. S., 2943.
Thompson, M. E., 2529.
Thompson, P. E., 1714.
Thompson, R. E. M., 2442.
Thompson, S. W., 3364.
Thompson, S. W., Jr., 1769, 1770.
Thompson, S. Y., 1868.
Thomsen, A., 3129.
Thomson, D. M., 712.
Thomson, J. D., 2355.
Thomson, P. D., 3868.
Thomson, W., 631.
Thomson, W. E. F., 3618.
Thoonen, J., 949.
Thorbecke, G. J., 1467.
Thorn, G. W., 1538.
Thorne, C. B., 656.
Thorne, J. L., 75, 2937.
Thornsteinsson, T., 3772.
Thornton, G. W., 1888.
Thorp, F., Jr., 343.
Throssell, G. L., 3799.
Thumb, N., 3413.
Thurston, J. P., 3912, 3913.
Tibrea, S., 1326.
Tiecken, G. W., 213.
Tiefenbacher, H., 2496.
van Tienhoven, A., 736, 895, 2680, 3041.
Tien-Hsi Cheng, 3270, 3999.
Tilden, E. B., 1317.
Tilgner, K., 1350.
Tillman, A. D., 3672, 3674.
Timoney, J. F., 1885.
Tindal, J. S., 1596, 3026 .
Tiner, J. D., 3639.
Tirčo, S., 767.
Titchen, D. A., 1598, 2647.
Tobin, A. J., Jr., 341.
Tocker, H. H., 2283.
Todd, A. C., 245.
Todd, E. W., 2188.
Todd, J. R., 2582.
Toivanen, E., 1839.
Tokumaru, T., 411.
Tolhurst, J. C., 2731.
Tombes, A. S., 3387.
Tomescu, V., 1326, 1327.
Toming-Reintam, V. M., 4158.
Tomlin, D. C., 3314.
Tomlin, S. C., 596.
Tomlinson, A. J. H., 92.
van Tongeren, H. A. E., 640.
Tooth, B. E., 2364.
Topolnik, E., 438, 1083.
Torlone, V., 3125.
Torres Gost, J., 3870.
Torturella, L., 1762.
Toshkov, A., 2452.
Tóth, B. L., 4054.
Totorcea, N., 1326.
Totton, M., 3706.
Tourtellotte, M., 1346.
Townsend, S. M., 332.
Toy, B. L., 3265.
Toygarli, S. A., 1141.
Trapani, I. L., 3259.
Trapp, A. L., 2850.
Trautman, R. J., 3898.
Trautwein, G., 320.
Trautwein, K., 3830.
Trawinski, A., 2909.
Treece, E. L., 3479 .
Tregier, A., 1959.
Trenti, F., 2727.
Trevan, D. J., 1259.
Trevisan, G., 2082.
Triau, R., 97.
Tribe, D. E., 1149 .
Troc, O. K., 3544.
Troise, C., 35.
Tromba, F. G., 1122, 2539, 3632, 4021.
Trost, W. A., 3921.
Trowbridge, R. F., 1216 .
Trueblood, M. S., 396.
Trum, B. F., 2928.
Trumić, P., 118.
Truszczyński, M., 321, 2439, 3491, 3492.
Trylich, C., 3585.
Tsuda, T., 601.
Tsunoda, K., 78, 79.
Tubis, M., 3337.
Tucker, J. F., 3127.
Tucker, R. G., 1866, 1867, 4057.
Tudor, D. C., 361.
Tudoriu, C. D., 2047.
Tugwell, R. L., 1404, 2808, 3859.
Tumlin, J. T., 143.
Turevich, S. T., 88.
Turman, E. J., 2362.
Turnre, C. W., 542, 595, 909, 1185, 3441, 3693.
Turner, G. S., 90.
Turner, H. N., 3288.
Turner, J. H., 1106, 3280.
Turner, R. C., 3370.
Turpin, A., 2433.
Turubatović, R., 118, 119.
Tuttle, R. W., 4080.
Twomey, D., 666.
Tyler, F. H., 2993.
Tyler, W. J., 613.
Tyler, W. S., 3753.
Tyrrell, E. A., 2075.
Tzortzaki, N., 3821.

Udall, R. H., 3313.
Van Uden, N., 3170.
Udenfriend, S., 469. 2327.
Überreiter, O., 2691.
Ueda, A., 4068.
Ueda, S., 3049.
Uemura, T., 1652.
Ugami, S., 922.
Uglialoro, A., 1890.
Uherko, J., 1334, 4127.
Uhlmann, W., 3218.
Ujváry, G., 2028.
Ukita, T., 381.
Ulberg, L. C., 3437.
Ulbrich, F., 638, 1388, 2752, 3225.
Ullberg, S., 1658, 1913.
Ullmann, G., 2719, 3133.
Ullrey, D. E., 1373, 3154.
Ul'yanov, P. V., 158.
Ul'yanov, S. D., 1813.
Umetsu, M., 3668.
Umov, A. A., 168.
Underdahl, N. R., 636, 639.
Underwood, E. J., 1855.
Uppal, D. R., 759.
Upton, A. C., 1466.
Urbányi, L., 4056.
Urman, H. K., 3926.
Uroz, J., 85.
Urquhart, G. M., 483.
Ushijima, J., 3339, 4061.
Utzig, J., 1140, 3294.
Uys, P. L., 893.

Vacirca, G., 1497.
Váczi, L., 2750.
Valenti, G., 1926.
Valentin, F., 19, 675, 999, 1937.
Valentine, J. C., 2564.
Valentine, R. C., 447, 715.
Vallée, A., 1065, 2046, 2492, 2493, 3243.
Vallenas, P. A., 1549, 1550.
Vallette, H., 995.
Vana, L. R., 3866.
Vanbreuseghem, R., 2707.
Vance, H. N., 3490.
VanDemark, N. L., 286, 622, 930, 1258, 1621, 2663, 3036.
Vandeplassche, M., 1631, 1633, 2334, 2779.
Vanderberg, J. P., 3270.
Vandiviere, H. M., 3095.
Vandra, E., 3101.
Vaněk, J., 1193, 3724.
Vanschoubroek, F., 1859, 3324.
Vantsis, J. T., 1756.
Varacca, D. W., 3228.
Varadin, M., 1627.
Varejka, F., 3965.
Varenika, N., 1620.
Varenne, H., 2120.
Varfolomeeva, A. A., (See Warfolomejeva), 2428.
Varges, W., 801.
Varma, A. K., 2205.
Vasil', M., 1195.
Vassura, G., 3013.
Vaughan, L. C., 3360.
Vavich, M. G., 1507.
Vawter, G. F., 2594.
Vazquez, J. J., 2521.
Vecherkin, S. S., 2104.
v.d. Veen, H. E., 3444.
Veenendaal, H., 3716.
Veeraraghavan, N., 2833.
Vegapetyan, V. G., 4014.
Vegors, H. H. 1116, 4027.
Velasquez, E. E., 1012.
Velle, W., 1265, 2675, 3442, 3443.
Velling, G., 76, 1790.
Veltsos, A., 2768.
Velu, H., 580.
Venable, J. H., 3440.
Venturoli, M., 3531, 3746.
Venzke, W. G., 2679.
Verain, A., 3433.
Verdcourt, B., 2204.
Verge, J., 980, 1039, 1763, 2826, 2890, 3212, 3213, 3502
Verhaart, W. J. C., 1247.
Verlinde, J. D., 135, 3576, 3967.
Vernon, J., 2962.
Vershilova, P., 1704.
Versteeg, J., 3576, 3967.
Versyck, M., 3278.
Vervloesem, A., 3784.
Veselá, O., 821.
de Vesty, G., 3825.
Veto, I., 3889.
La Via, M. F., 1465.
Viallier, J., 975.
Vianello, G., 3008.
Vicari, G., 3888.
Vickers, A. E. J., 318.
Vickers, H. R., 2382.
Vickery, J. R., 3430.
Victor, D. A., 829.
Vigier, P. 500.
Vigo A. 4122.,
Villee, C. A., 316, 4167, page 684.
Villella, J. B., 2543.
Villemot, J.-M., 3219.
De Villiers, I. F., 1105.
Vincent, G., 2890.
Virat, B., 2492, 2493, 3243.
Visek, W. J., 2618.
Visser, H. K. A., 1594.
Vitale, J. J., 1528.
van Vliet, G., 1593, 2317.
Van Vloten, J. G. C., 2374.
Vogel, H., 1483, 3100.
Vogel, R. A., 1732.
Vohra, P., 1521, 1532.
Voiovich, N. I., 1417.
Volcani, R., 236.
Volkert, M., 2172.
Voloskov, P. A., 2344.
Volwiler, W., 3424.
Voronin, M. V., 470, 2900.
de Vos, W. H., 927.
Voskoboinikov, V. M., 2308.
Vošta, J., 3883.
Vrolijk, H., 135.
Vrtiak, J., 762.
Vuillaume, P., 2724.
Vujošević, J., 1742.

Waalkes, T. P., 469.
Wade, A. E., 812, 2917.
Wade, L. L., 1802.
Wagemann, H., 3812.
Wagner, J. C., 3099.
Wagner, M., 1467, 3711.
Wahby, A. M., 2380.
Waibel, P. E., 891.
Waite, R., 1249.
Waites, G. M. H., 1605, 3030.
Wakelam, J. A., 3666, 4049.
Wakeley, C., 2551.
Wakim, K. G., 1862, 2000.
Waksman, B. H., 977.
Walden, N. B., 355.
Walder, D. N., 1977.
Wales, R. G., 3434, 3435, 4133.
Waletsky, E., 3272.
Walker, C. A., 250, 1235, 4108.
Walker, D., 550.
Walker, E. C., 2435.
Walker, J. H. C., 3130.
Walker, L., 1964.
Walker, R. V. L., 3244.
Walker, V. C. R., 3489.
Walkey, F. L., 1693.
Wallace, C. R., 1887.
Wallace, H. D., 2956, 3314.
Wallace, J. H., 2015, 3485.
Wallace, W., 4023.
Walley, J. K., 1127, 2919.
Wallis, C., 1768.
Wallis, R. C., 2134, 2137, 2138.
Wallmark, G., 3079.
Wallner, J., 174.
Walsh, T., 1861.
Walshe, S. L. H., 3805.

Walter, H., 2653.
Walter, W. G., 1145, 2932.
Walton, A., 611, 617, 3767, 4136.
Waluschko, A., 1683.
Walzl, H., 2781.
Wandokanty, F., 3294.
Wang, C. J. K., 1733.
Warfolomejeva, A. A., 2428.
Warner, P., 1052.
Warner, R. G., 188, 505, 1513.
Warrack, G. H., 377.
Warren, J., 1455.
Warren, J. V., 3416, 3417.
Warstat, V., 224.
Warwick, A., 137.
Warwick, E. J., 971.
Wasserman, R. H., 201, 1203.
Wasz-Höckert, O., 331.
Watanabe, M., 2660, 2767.
Waters, N. F., 186.
Waterson, A. P., 2871.
Watkins, J. E., 3726.
Watkins, J. R., 2506.
Watkins, T. D., Jr., 3663.
Watson, D. W., 652.
Watson, G. S., 2883.
Watson, H. H., 3276.
Watson, H. J. C., 3543.
Watson, R. H., 935, 1953, 4069
Waugh, R. K., 2955.
Wawrzkiewicz, J., 1676, 3584.
Wayne, L. G., 339, 340.
Weakley, C. E., Jr., 3007.
Wearden, S., 2662.
Weatherall, M., 4111.
Weaver, C. R., 3402.
Weaver, R. H., 3169.
Webb, M., 1978.
Webb, M. S. W., 3334.
Weber, A. F., 2316, 3757.
Weber, H. 1937.
Weber, T. B., 1125.
Webster, G. R., 1280.
Webster, W., 1981.
Webster, W. M., 600, 2427, 2700, 2769.
Wecker, E., 2476, 2500.
Wedman, E. E., 1724.
Weed, L. A., 2050.
Wegmann, H., 3715.
Wehmeyer, P., 3208.
Wehn, P. S., 3747.
Wehr, E. E., 3916.
Weichert, W., 2338.
Weidel, W., 1987, page 110.
Weidmann, S. M., 4120.
Weigle, W. O., 1461, 2187, 2521, 2892.
Weil, A. J., 1683.
Weil, M. H., 1725.
Weinbren, B. M., 2855.
Weinbren, M. P., 1061, 2855.
Weinhold, E., 2726.
Weinman, D., 2092.
Weinrach, R. S., 2893, 2894.
Weinstein, H. I., 4103.
Weinstein, I. M., 256.
Weir, D. R., 3790.
Weir, W. C., 517, 3790.
Weiss, D. L., 2305.
Weiss, D. W., 665, 3829.
Weiss, H. S., 1595, 2276.
Weiss, K., 2407.
Weiss, M. L., 80.
Wiess, P., 1246.
Weissbach, H., 469.
Weitz, B., 4002.
Welbourn, R. B., 2946.
Welch, A. D., 184.
Welch, H., 2331, 4103, page 684.
Weller, R. A., 521.
Wellmann, G., 17.
Wells, A. Q., 665.
Wells, K. F., 1644.
Welsh, H. H., 3953.
Werner, C., 3124.
Werthemann, A., 83.
Werthessen, N. T., 945.
Wertman, K. F., 1536.
Wesselén, T., 2160, 3211.
West, G. B., 2925.
West, J. L., 1211.
Westerfield, W. W., 526.
Westermarck, H., 1562, 1839.
Westin, B., 3053.
Wetherill, G. D., 488.
Wetzel, R., 3001.
Wexler, B. C., 4071.
Whaler, D. C., 3521.
Wharton, R. H., 2210.
Whatley, J. A., Jr., 2333.
Wheat, J. D., 2976.
Wheeler, H. O., 3176.
Whenham, G. R., 3490.
White, E. G., 170.
White, F. H., 1720, 1722, 1752, 2065, 2107, 3161.
White, G., 3538.
White, I. G., 284, 929, 3434, 3435, 3773, 4133.
White, P. G., 441, 2062, 3973.
White, R. R., 189, 1542.
White, T. G., 366.
Whitehead, T. P., 1560.
Whiteman, C. E., 2850.
Whitlock, H. V., 492.
Whitlock, J. H., 1112, 1123.
Whitmire, C. E., 2177, 2178, 2179.
Whittaker, V.P., 3024.
Whittem, J. H., 300, 550, 1272.
Whitten, M. K., 2347.
Whitten, W. K., 2350.
Whittlestone, W. G., 2640, 3409.
Wicht, W., 3836.
Widdas, W. F., 1585.
Widdowson, E. M., 593, 1509, 2591, 2592, 3754.
Widelock, D., 1320, 1483.
Wiedner, W., 472.
Wiesner, E., 502.
Wigglesworth, V. B., 1279.
Wildik, R. W., 2737.
Wiktor, T. J., 2845.
Wild, A., 1553.
Wildman, A. B., 2310.
Wildy, P., 1994.
Wilkens, E. H., 2214.
Wilkens, H., 2978.
Wilkie, W. J., 3664.
Wilkinson, J., 2707.
Wilkinson, J. H., 3372.
Wilkinson, J. S., 577.
Will, D. H., 862.
Will, D. W., 333.
Willems, R., 3214.
Willett, E .L., 3432, 3770.
Willett, K. C., 3194.
Williams, A. D., 2598.
Williams, C., 516.
Williams, E. L., 3718.
Williams, H. H., 2115.
Williams, J. D., 531.
Williams, J. R. B., 8.
Williams, J. S., 155.
Williams, L. F., 2435.
Williams, M. C., 1061, 4002.
Williams, M. W., 1910, 2298.
Williams, N. M., 1149.
Williams, R. R., 2182.
Williams, R. T., 2220.
Williams, T. P., 1366.
Williams, V. J., 189, 2232.
Williamson, J., 2801, 3543.
Williamson, L. A., 2137, 2138.
Williamson, W. M., 1317.
Willinger, H., 2781.
Willis, A. T., 48.
Willis, H. S., 3095.
Willis, L. A., 3454.
Willis, R. A., 4164, page 684.
Wilsdon, A. J., 1429.
Wilson, A. A., 3671.
Wilson, A. L., 1963.
Wilson, C. D., 1996, 3471.
Wilson, C. E., 678.
Wilson, D., 2502, 2503.
Wilson, H. G., 2522.
Wilson, I. A. N., 1825, 2540.
Wilson, J. B., 3167.
Wilson, J. E., 555, 3126.
Wilson, J. H. G., 2162, 2257.
Wilson, P. N., 1972.
Wilssens, A., 2089.
Wilwerth, A. M., 1980, 2067.
Wind, S., 1390.
Winder, F., 666.
Windrum, G. M., 3382.
Winegrad, A. I., 1538.
Wing, J. M., 1153, 2941.
Winget, C. M., 4112.
Winkel, F., 663.
Winkle, S., 1345.
Winkler, W., 134.
Winn, J. F., 418.
Winter, A., 1902.
Winter, A. J., 3167.
Winter, A. R., 782.
Winter, H., 1001, 3343, 3555.
Winterfield, R. W., 443, 2168, 3252, 3253.
Winterhaltler, K., 1099.
Winterhalter, M., 796, 1807.
Wintrobe, M. M., 2945.
Wintzer, H. J., 2266.
Wise, G. H., 507, 2955.
Wise, H. M., 2434.
Wise, M. B., 3673.
Wissler, R. W., 1465, 2943.
Witcomb, M. A., 111.
Withers, F. W., 3697.
Witt, N. F., 4044.
Wittmann, G., 1048, 2819, 2820..
With, T. K., 2654.
Woernle, H., 2496.
Wohlfarth, E., 2341.
Wohlzogen, F. X., 1585.
Wojciechowska, S., 3985.
Wojnke, L., 2968.
Woke, P. A., 3246.
Woldring, M. G., 1594.
Wolfe, H. R., 461, 1462, 1463, 3607.
Wolff, A. H., 1892.
Wolkoff, S., 2671.
Wong, P. C., 3885.
Wood, H. G., 1589.
Wood, W., 3977.
Wood, W. B., Jr., 4063.
Woodard, G. T., 154, 242.
Wood-Gush, D. G. M., 3801.
Woodring, F. R., 417.
Woodroffe, R., 1321.
Woods, A. C., 1366.
Woolley, D. W., 2330.
Wooten, E., 4081.
Worden, A. N., 1991, 3688, 4098.
Work, E., 62.
Worker, N. A., 3682, 3683.
Worley, D. E., 1826, 2545.
Worseck, M., 3164.
Wostman, B., 1467.
Wotton, R. M., 1401.
van der Wouden, M., 2621.
Wray, J. R., 2911.
Wrenn, T. R., 2676.
Wright, C. A., 1648, page 110.
Wright, E., 3692.
Wright, E. W., 1182.
Wright, G. G., 1661.
Wright, G. W., 886.
Wright, H. N., 2619.
Wright, J. F., 2678.
Wright, J. G., 1293, 3780, page 110.
Wright, M. J., 1215, 1902.
Wright, M. L., 844, 3796.
Wright, P., 1088.
Wright, R. D., 3758.
Wroblewski, A., 2520, 3609.
Wyand, D. S., 2316.
Wyant, Z. N., 1111, 1486, 1798, 4025.
Wyler, R., 640, 1792.
Wyndham, C. H., 4109.
Wyne, J. W., 2612.
van den Wyngaert, M., 84, 682.
Wynne, E. S., 3297.
Wynohradnyk, V., 2059.

Yabe, N., 669.
Yacowitz, H., 569, 1390.
Yadava, R. C. P., 265.
Yamagiwa, S., 1652.
Yamaguchi, M., 219.
Yamamoto, H., 909.
Yamamoto, I., 2681.
Yamamoto, R., 394, 3179, 3540, 3906.
Yamamoto, S., 2767.
Yamashita, J., 161, 2536.
Yancey, F. S., 2465.
Yarosevich, G. A., 1744.
Yashenkina, M. I., 3844.
Yates, V. J., 142, 1445.
Yaw, K. E., 21, 1684.
Yeates, N. T. M., 1232, 2225, 4143.
Yeck, R. G., 3398.
Yeh Liang-Sheng, 2211.
Yenson, M., 462.
Yevich, P. P., 678, 2614.
Yokoyama, K., 3669.
York, C. J., 114, 760, 1428, 1778, 2864, 3227.
Yoshihara, G. M., 433.
Yost, D. H., 4040.
Youmans, G. P., 1323, 2399.
Youmans, J. B., 2293.
Young, F., 2929.
Young, G., 3899.
Young, G. A., 636, 639.
Young, G. B., 1963.
Young, R. J., 329.
Young, S., 3105.
Young, S. S. Y., 1233.
Young, W. C., 619.
Young, W. F., 1511.
Yuan Chang-Kuo, 2790.
Yudkin, J., 860.
Yunker, C. E., 1476.
Yushchenko, N. P., 2339.
Yuskovets, M. K., 1358, 2044.

Zabolotnuii, I. I., 2628.
Zachariae, F., 2667, 2668, 2669, 4137.
Zacher, J., 2723.
Zafer, S. A. W., 82.
Zaharija, I., 2060, 2765, 3517.
Al Zahawi, S., 1865.
Zahran, G. E. D., 86.
Zák, F., 2432.
Zaki, A. H., 2278.
Zamecnik, P. C., 504.
Zappasodi, P., 2395.
Żarnowski, E., 827.
Zarrow, M. X., 586, 1623.
Zarzuelo, E., 2832.
Zarzycki, J., 2404.
Zavadil, R., 3991.
Zavagli, V., 1765.
Zbořil, J., 3827.
Zdrodowski, P., 1704.
Zebrowski, L., 2872, 2873.
von Zeipel, G., 2146.
Zelenka, P., 16, 3517.
Zeljko, M., 1439, 3858.
Zeller, M., 2738.
Zeškov, B., 230.
Zettl, K., 679.
Zhuravlev ,E. N., 1558.
Zícha, B., 1190.
Zietschmann, O., 967, page 110.
Ziffer, H., 2965.
Zil'ber, L. A., 4042.
Zilversmit, D. B., 571.
Zimmermann, F., 325.
Zimmermann, T., 2489.
Zimmermann, W. J., 4020.
Zirbel, L. W., 1778, 3227.
Zitrin, C. M., 831.
Złotnik, I., 117, 2853.
Znojilová, V., 556.
Zoletto, R., 2273.
Zolli, Z., Jr., 1581, 3892.
Zolotova, A. S., 3552.
Żórawski, C., 696.
Zsigmond, L., 2497.
Zuber, S., 998.
Zubkova, R. I., 452.
Zuckerman, S., 2348.
Zuffa, A., 1045, 1047, 1075, 3948, 3972.
Zukiński, T., 1747.
Zuliani, T., 2343.
Zumpt, F., 4003.
Zundel, G., 2244.
Zureck, F., 686.
Zweifach, B. W., 683, 684, 3711.
Zwierz, J., 44.
Zwierzchowski, J., 44, 474.
Zworykin, K. A., 1311.
Zworykin, V. K., 1278, 1641.

SUBJECT INDEX

The index is constructed fundamentally from the titles of articles, which may not indicate all the points of interest in the abstract or original. Readers should therefore always search the main headings and the "general" sub-headings for points of special interest:—*e.g.* for references to the control of bovine brucellosis, see "Brucella Infection, general" and "Brucella Infection, in cattle" in addition to "Brucella Infection, control". General headings should also be searched for particular parasites. For drug treatment, see under the name of condition treated.

[The number refers to abstracts and not to pages]

A

ABATTOIRS. Textbook on function, construction, technology and administration, **3812.**

ABORTION, EQUINE VIRUS. As cause of hepatitis in hamsters, **108**; **3956**; propagation in horse kidney tissue culture, **1424**; histopathology of foetuses, **2844.**

ABORTION, GENERAL. In cows from weeds containing nitrates, **1215**; studies in livestock, particularly cattle, **2682**; studies on epizootic abortion in cattle, **2976.**
See also Blood, groups; Erysipelothrix Monocytogenes Infection; Leptospira Infection, cattle; horses; swine; Mycobacterium Tuberculosis Infection, general; Poisoning, plants; Salmonella Abortus-Ovis Infection; Sex Hormones, oestrogens; Toxoplasma Infection, sheep; Trypanosoma Infection, cattle; Vibrio Fetus Infection; Vibrios, General.

ABORTION, OVINE VIRUS. Account of outbreaks, **116**; electron microscopy of virus, **1060**; pathogenicity of virus for nervous system, and relation to lymphogranuloma virus, **2149**; c.f. antigen, **3233**; chemotherapy, **3234**; in Hungary, **3962**; **3963.**

ABSCESSES. Spinal, causing paralysis in sheep, **2069**; chlortetracycline treatment of cervical abscesses in pigs, **3390.**
See also Pasteurella Infection, general.

ABYSSINIA. See Cysticercus; Neoplasms, in dogs.

ACARICIDES. See Parasiticides.

ACCLIMATIZATION & CLIMATE. Effect of tropical climate on European-type cattle, **628**; **2365**; sheep husbandry in tropical Australia, **953**; thermoregulation, adaptation and production of cattle in tropics, **2366**; heat and water in tropical Merino, **2634.**
See also Altitude; Digestive System, intestines; Lactation; Light; Sweating and Sweat Glands; Technique, miscellaneous; Temperature; Water; Zootechny.

ACETONAEMIA. See Ketosis.

ACETYLCHOLINE. See Milk and Milk Products, composition.

ACKEE TREE (BLIGHIA SAPIDA). See Poisoning, Plants.

ACORNS. See Poisoning, plants.

ACROTERIASIS. See Teratology.

A.C.T.H. See Adrenocorticotrophic Hormone.

ACTINOMYCES DERMATONOMUS INFECTION. See Dermatophilus Infection.

ACTINOMYCETES. See Mycobacteria, General; Nocardia.

ACTINOMYCOSIS. Intracranial, in a cow, **2082**; treatment with mercury-arsenic-sodium iodide compound, **3901.**

ACUARIA. A. uncinata in geese and ducks, **491.**

ADENOMATOSIS, PULMONARY. See Jaagziekte; Neoplasms, general.

ADENOSINE TRIPHOSPHATE. See Bones, disease.

ADENOVIRUS. See Viruses.

ADHESION, SEROLOGICAL. See Immunology, antibodies and antigens.

ADRENAL GLAND.

General. Determination of magnesium in various functional states, **203**; effects of adrenal insufficiency and DCA overdosage on adrenalectomized sheep, **1229**; growth, **1604**; response of glomerulosa layer in rats on different salt diets, **2585**; relationship between thyroid and adrenals in temperature regulation, **2649**; adrenalectomy in ruminants, **3066**; insufficiency in a dog, **3705**; studies in cattle, **3757**; transplantation in sheep, **3758.**
See also Hair; Lactation.

Cortical hormones. Use of corticosteroids in vet. medicine, **583**; **904**; **3016**; eosinopenia produced by corticoids and ACTH, in horses, **584**; book, adrenal cortex, **964**; accessory adrenal cortical tissue in cattle, **1248**; effects on intermediary metabolism, **1538**; determination of activity in cattle, **1547**; function test in dogs, **2286**; effect of liver disease on function, **2993**; A.C.T.H. causing arteriosclerosis and other diseases in rats, **4071.**
See also Ketosis; Radiations; Salmonella Gallinarum Infection.

Medullary hormones. Uterine response to adrenaline in cows and sheep, **585**; **3031**; biosynthesis of norepinephrine and epinephrine by perfused calf adrenal, **2327**; distribution of catechol amines in bovine medullary homogenates, **2652**; response of medulla in ovine foetus to asphyxia, **3759.**
See also Blood, corpuscles (white); Neoplasms, in dogs.

ADRENOCORTICOTROPHIC HORMONE (A.C.T.H.). See Adrenal Gland, cortical hormones; Blood, general; corpuscles (white); Joints; Urinary System, urine.

AEDES. See Wesselsbron Virus.

AEROSOLS. See Anthelmintics, for cattle; Hexylresorcinol; Parasiticides.

AFRICA. See under names of African countries.

AFRICAN SWINE FEVER. See Swine Fever, African.

AGALACTIA, CONTAGIOUS, OF SHEEP & GOATS. Action of merthiolate on agent, **1736.**

AGALACTIA, GENERAL. Chlortetracycline treatment of agalactia in sows, **54**; treatment with E. coli antiserum in sows, **2743.**
See also Mammary Gland.

AGE. See Bood, composition; corpuscles (red); pressure; Bones, general; Cattle, helminth parasites; Circulatory System, heart; Genital System, vagina and vulva; Immunology, precipitation; Iron; Myxomatosis; Pancreas; Zootechny.

AGRANULOCYTOSIS, FELINE VIRUS. See Enteritis, Feline.

AIR POLLUTION. See Eyes, diseases.

AIR SAC INFLAMMATION. See Sinusitis.

ALDRIN. See Parasiticides, chlorinated hydrocarbons.

ALEUTIAN DISEASE. See Mink.

ALGAE. See Nutrition and Metabolism, poultry.

ALKALOIDS. See Poisoning, organic.

ALLANTOIC, AMNIOTIC & CHORIONIC MEMBRANES & FLUIDS. See Genital System, placenta and foetal membranes.

ALLOXAN. See Diabetes.

ALPACAS, LLAMAS & VICUÑAS. Diseases of, in Peru, **1188**; physiological constants, **1549**; blood glucose in alpacas, **1550.**

ALTITUDE. "Brisket Disease" syndrome, **1545**; grazing habits of zebu in high altitude temperate climate, **3063.**

ALUMINIUM HYDROXIDE. See Nutrition and Metabolism, poultry; Rabies, immunology.

AMAUROSIS. See Eyes, diseases.

AMBLYOMMA. See Ticks.

AMINO ACIDS. And digestibility and biological value of bacteria, **519**; composition of hydrolysates of ovine rumen microbial preparations, **521**; methionine supplements for chicks, **849**; **2572**; role of lysine in prevention of feather depigmentation in poults, **1521**; antitoxic action of glutamic acid with regard to isoniazid, **2306**; sites of protein synthesis demonstrated by labelled methionine, **2573**; absorption of radiolysine by chicks fed penicillin, **2574**; amino acid imbalance on low fibrin diets, and nitrogen retention, **2575**; **2576**; carbon transfer from propionate to amino acids in cows, **4058.**
See also Anaemia, General; Calcium; Copper; Escherichia Coli Infection, general; Influenza, virus; Leucosis, general; Nervous System, general; Salmonella Group; Semen and Spermatozoa, composition; Trypanosoma Equiperdum Infection; Urinary System, urine; Vitamins, vitamin C.

AMINOACRIQUINE. See Anthelmintics, for sheep and goats.
p-AMINOBENZOIC ACID. See Para-Aminobenzoic Acid.
AMINONICOTINAMIDE. See Nervous System, diseases.
AMOEBA. Influence of diet on histology in exp. infected g.pigs, 1399; contaminating tissue culture, 1740; treatment with diamines, 2091; glaucarubin treatment, 2455.
AMMONIA. Fumes causing eye lesions in chicks, 886; 1201.
See also Blood, composition; Digestive System, fauna and flora; ruminant digestion; New-born Animals.
ANAEMIA, EQUINE INFECTIOUS. Diagnosis by c.f. test, 102; 1776; properties of horse serum treated with NaCl, 103; serum study, 104; leucocyte picture, 105; bilirubin formation and haemolysis, 106; exp. transmission, 107; virus study, 1054; diagnosis, in Mexico, 2842; liver biopsy in diagnosis, 2843; modified c.f. test (Altara et al.), 3225; agglutination test, 3584; diagnostic aid, 3585; in Japan, 3586; preparation of antigen for c.f. test, 3954; sideromonocytes in venous blood, 3955.
ANAEMIA, GENERAL. Aetiology, in piglets, 206; aplastic, in chicks, 1556; endocrine aspects of pregnancy anaemia in rabbits, 1623; feline infectious, 2090; studies in pigs, 2248; in calves, 2583; a transmissible, infectious anaemia in fowls, 2879; due to lysine deficiency in swine, 2945; iron dextran poisoning in piglets, 2999.
See also Blood, corpuscles (red); Haemolytic Disease of New-Born; Iron; Leeches; Poisoning, organic.
ANAESTHESIA & ANALGESIA.
General. Tranquillizers and morphine-mania in cats, 1224; book, veterinary anaesthesia, 1293; pharmacological properties of 21-hydroxypregnanedione sodium succinate ("hydroxdione"), 1582; suboccipital procaine combined with i/v chloral hydrate, 1915; anaesthesiology, 3393; succinylcholine in domestic animals, 3394; potentiation of pentobarbital by glucose, 3395.
See also Bromochlorotrifluoroethane (Fluothane).
In cattle. Of the eye, 587; apparatus for cattle and horses, 2307; casting horses and cattle with succinylcholine, 2632.
See also Anaesthesia and Analgesia, general.
In fowls. Urethane, for non-survival, 588; effect of CO_2 immobilization on bleeding in fowls, 633; combuthal for chicks, 905; general, in birds, 3020.
In dogs. 1916; 3732.
In horses. Apparatus for cattle and horses, 2307; casting horses and cattle with succinylcholine, 2632; apparatus for ether anaesthesia in horses, 2633.
See also Anaesthesia and Analgesia, general.
In swine. Intraosteal and i/v, using alcoholic soln. of chloral hydrate, 2308.
ANAFILAROIDES. A. rostratus causing parasitic bronchitis in cats, 4031.
ANAPLASMA INFECTION. In cattle in Macedonia, 1751; detection of A. marginale by fluorescent antibody, 1752; c.f. test, 1753; inhibition of infection in cattle with oxytetracycline hydrochloride, 1754; morphology of A. marginale, 1755; chemotherapy in cattle in Brazil, 1760; cortisone and immunity in calves, 2107; 2108; pathogenesis in sheep, 2109; mixed Anaplasma-Babesia infection in sheep, 2110; and behaviour of radioactive chromium and iron in calves, 2458; peracute, in cattle, 2812; antibody response in exp. infected deer, 2813; rivanol treatment in cattle, 2814.
ANATOMY. See Books.
ANCYLOSTOMA. See Anthelmintics, for dogs and cats.
ANDROGENS. See Sex Hormones.
ANGOLA. See Pleuro-Pneumonia, Bovine Contagious.
ANIMAL PRODUCTION. Influence of high production pasture on animal health, 1831; beef cattle studies in Australia, 3799; zebu crosses for beef, 3800.
See also Cysticercus; Hygiene, food; Reindeer; Sex Hormones, oestrogens; Weight, Body; Zootechny.
ANTHELMINTICS.
General. Cadmium oxide against T. spiralis in mice, 480; phenothiazine compound for control of stomach worms in deer, 810; testing of 44 substances in vitro against Ascaris suum, 821; nomogram for doses of drugs, particularly phenothiazine, 896; tin arsenate for sheep, calves and poultry, 1481; action of piperazine on A. lumbricoides, 1489; ineffectiveness of "Polybor-3" on ascaris eggs, 1491; dithiazanine, 1945; piperazine-carbon disulphide complex (Parvex), 1798; treatment and prophylaxis of parasitic diseases, 2215; new series of compounds, 2915; s/c inj. of CCl_4, 3622; in vitro test, 3639; method of recording effect of anthelmintics on Ascaris lumbricoides, 3640; treatment of soil with sodium pentachlorophenate against Ascaridia lineata, 4036.
See also poisoning, therapeutic substances.
For cattle. Toluene against Bunostomum phlebotomum, and efficiency of 1:8 dihydroxyanthraquinone, 162; ascaridol aerosols against lungworms, 167; metabolism of phenothiazine in calves, 245; diethylcarbamazine treatment of Dictyocaulus viviparus in calves, 489; cyanacethydrazide and CCl_4 in parasitic bronchitis, 490; stibophen treatment of stephanofilariasis, 831; parenteral CCl_4, 1099; 2203; Dow ET-57, 1120; 1826; cyanacethydrazide against lungworms, 1127; 2207; 2919; intraruminal application of CCl_4 against liver flukes, 1807; piperazine compounds, 1815; lungworms, 2207; toxicology in calves given massive doses of phenothiazine, 2297; cyanacethydrazide, 2541; weight gain in phenothiazine-treated calves, 2542; "neguvon", an organic phosphorus compounds, 3289; Bayer 21/199, 3637; effect of DDT, BHC and CCl_4 on semen production, 4011.
See also Anthelmintics, general; Thelazia.
For dogs & cats. Bichlorophenarsine hydrochloride and thiacetarsamide (arsenamide) treatment of heartworm, 1132; 1820; hexylresorcinol, 2913; piperazine adipate, 4035; against Ancyclostoma caninum, 4022.
For horses, donkey & mules. Parenteral CCl_4, 1099; piperazine carbon disulphide, 1111; 2920; polymeric piperazine carbodithioic acid, 2194.
For poultry. Evaluation of compounds eliminating tapeworms in exp. infected fowls, 804; piperazine compounds for control of Ascaridia and Heterakis, 826; 832; 1128; 2544; 2545; 2546; against Ascaridia galli, 827; CCl_4 against Capillaria in pheasants, 1109; CCl_4 against syngamosis in pheasants, 1124; oral CCl_4 against caecal trichostrongylosis in partridges and other birds, 1487; dithiocarbamates against Ascaridia, 2922; CCl_4: effect on and distribution in A. galli, 3287; sex difference in susceptibility of fowls to CCl_4 poisoning, 3377; Eimeria and Capillaria species in pigeons and control of Ascaridia columbae with piperazine citrate, 3991; potentiation of weight gain by piperazine diacetate, 4098.
See also Anthelmintics, general.
For sheep & goats. Diethylcarbamazine citrate against Dictyocaulus in sheep, 168; intratracheal sodium salicylate against Muellerius, 169; lead arsenate against Moniezia expansa, M. benedeni, Stilesia globipunctata and Avitellina centripunctata, 476; use of phenothiazine against Trichostrongylus colubriformis and other worms, 485; arsenicals against Moniezia in lambs, 803; "nemadis" against Nematodirus, 1117; effect of minerals and phenothiazine on resistance to Haemonchus contortus, 1121; cyanacethydrazide against lungworms, 1127; 2919; effect of divided dosage of phenothiazine, 1136; s/c inj. of CCl_4 against ovine fascioliasis, 1478; strain response of nematodes to phenothiazine, 1486; tin arsenate, mepacrine and aminoacriquine against Avitellina and Thysanosoma in sheep, 1813; copper methylarsenate and phenothiazine, 1822; 1823; in the U.S.S.R., 1824; bephenium embonate against Nematodirus in lambs, 2916; dithiocarbamates against Nematodirus, 2922; emetine against sheep and goat lungworms, 3283; evaluation of some lungworm anthelmintics, 3284; "L13/59", 3290; piperazine dithiocarbamate with lead arsenate, 3636; Bayer 21/199, 3637; effect of DDT, BHC and CCl_4 on semen production, 4011; tin arsenate against Avitellina, 4014; effect of liquid paraffin added to CCl_4 used for s/c administration in sheep, 4019; resistance of H. contortus to phenothiazine, 4025.
See also Anthelmintics, general.
For swine. Cadmium oxide against ascarids, 171; s/c inj. of CCl_4 against Fasciola and Trichuris, 796-797; piperazine adipate, 825; against pulmonary and intestinal nematodes, 1134; "Hygromix" (streptomyces product), 1137; ascaricidal effect of piperazine, 1490; piperazines, 2214.
See also Anthelmintics, general.
ANTHRAQUINONE VIOLET. See Digestive System, general.
ANTHRAX. See Bacillus Anthracis Infection.
ANTHRAX-LIKE BACILLI. See Bacteria, General.
ANTIBIOTICS, General. Bacterial resistance, 55; 2071; effect on intestinal weight of chicks, 194; vitamin B_{12} and antibiotics in animal nutrition, 518; combinations; 578; 1579; levels in serum and tissues of fowls, 1227; relationship between method of treatment and subsequent immunity, 3085; diffusion between blood and synovial fluid in calves after administration, 3389; antibiotic from Streptomyces, with antifungal and insecticidal properties, 4101.
See also Anthelmintics for swine; Colostrum; Digestive System, ruminant digestion; Eperythrozoon; Erysipelothrix Rhusiopathiae Infection, immunology; Foot Rot; Growth, growth factors; Haemophilus Infection, fowls; Hygiene, food; Laryngotracheitis, Avian Infectious; Leptospira Infection, treatment; Magnesium; Nutrition and Metabolism, swine; Pasteurella Infection, general; cattle; Pleuro-Pneumonia Group; Poisoning, therapeutics and agricultural chemicals; Pox Diseases, fowl pox and diphtheria; Semen and Spermatozoa, general; diluents and additives; Sinusitis, Infectious, of Turkeys; Staphylococcus Infection, general; Trichomonas Foetus Infection, cattle; Vibrio Fetus Infection, cattle.
ANTIGONADOTROPHINS. See Sex Hormones, gonadotrophins.
ANTISEPTICS. See Disinfectants, Antiseptics and Sterilization.
ANTIVENENE. See Venoms.

"ANTRYCIDE" [Quinapyramine]. See Babesia Infection, treatment; Françaiella; Trypanosoma Infection, treatment.
APHIDS. See Poisoning, general.
APOCRINE GLANDS. See Sweating.
APPARATUS. See Technique and Apparatus.
AQUEOUS HUMOUR. See Eyes.
ARCTIC & ANTARCTIC REGIONS. See Rabies, general.
ARGAS. See Ticks, Argasidae.
ARGENTINA. See Foot and Mouth Disease, general.
ARGININE. See Blood, composition.
ARISTOLOCHIA. See Poisoning, plants.
ARSENICAL COMPOUNDS. See Anthelmintics, general; for dogs; for sheep; Detergents; Poisoning, inorganic.
ARTERIES. See Circulatory System.
ARTHRITIS. See Joints.
ARTHROBOTRYS. Destroying strongyle larvae, **481.**
ARTHROGRYPOSIS. See Teratology.
ARTHROPOD PARASITES, GENERAL. Ectoparasites of wild rabbits in Australia, **475**; transmitting brucellosis, **695**; control of external parasites, **793**; possible vectors of myxomatosis in New South Wales, **1072**; a trap for insects biting small vertebrates, **2527.**
See also Books, parasitology; Encephalomyelitis; "Kisenyi Disease"; Leptospira Infection, general; Neoplasms, in rabbits; Sodium and Sodium Compounds.
ARUBA (LESSER ANTILLES). See Salmonella Infection, general.
ASCARIDIA. Role in transmission and pathogenesis of Newcastle disease, **2873**; effect on weight in chicks, **3644.**
See also Anthelmintics, for poultry; Bronchitis, Avian Infectious.
"ASCARIDOL". See Anthelmintics, for cattle.
ASCARIS. Peritonitis following rupture of small intestine of infested horse, **820**; anaphylaxis in dogs produced by extracts, **822**; toxicity of extracts, anaphylaxis and hypersensitivity, **823-824**; differences in ovaries of A. lumbricoides from different locations, **1129**; i/d tests with Trichinella spiralis and A. lumbricoides antigens, **1133**; precipitin and i/d tests in pigs, **1488**; heterophile antibody against A. lumbricoides in rabbits and pigs, **1818**; **4033**; effect of cobalt-60 and X-rays on infectivity of ova, **2543**; effect of diet on development in pigs, **3286**; haemagglutination test, **3641**; serum agar double diffusion with Ascaris antigens, **3642.**
See Anthelmintics, general for swine; Swine Fever, general.
ASCORBIC ACID. See Vitamins, vitamin C.
ASPERGILLUS. Biochemical differentiation of A. niger, **3173**; as secondary contaminant in bovine malignant catarrh, **3531.**
ASSES. See Horses, Donkeys and Mules.
ASTEROCOCCUS. Adaption of A. mycoides to rodents, **1735**; agar double diffusion in the study of A. mycoides, **3538.**
ATAXIA. Enzootic, in lambs in Northern Ireland, **2582**; hereditary, in fox terriers, **2688.**
ATHEROSCLEROSIS. See Nutrition, in relation to disease.
ATOMIC ENERGY. See Radiations.
AUJESZKY'S DISEASE. Tissue culture, **411**; **2127**; **2466**; **3216**; in Slovakia, **750**; in cattle, **751**; pathology and histology in exp. infection, **752**; serum protection in piglets, **1041**; **2829**; localization of virus in c.n.s., **1042**; virus distribution in pigs infected by various routes, **2126**; in peripherally infected hamsters, **2465**; stillbirth a feature in pigs, **3568**; in dogs, **2830.**
AUREOMYCIN. See Chlortetracycline.
AUSTRALIA. See Animal Production; Arthropod Parasites, General; Cattle, diseases, general; Cobalt; Dirofilaria; Echinococcus; Encephalitis, Murray Valley; Myxomatosis; Oesophagostomum; Pleuro-Pneumonia, Bovine Contagious; Rabbits; Sheep, helminth parasites; Sterility, horses; Vermin Control; Vitamins, vitamin D_2; Zootechny.
AUSTRALORBIS. See Snails and Slugs.
AVITELLINA. See Anthelmintics, for sheep.

B

BABESIA BIGEMINA. See Babesia Infection, cattle
BABESIA BOVIS. See Babesia Infection, cattle.
BABESIA DIVERGENS. Study of, **3929.**
See also Babesia Infection, cattle.
BABESIA INFECTION (PIROPLASMOSIS).
General. Effect of cod-liver oil and vitamin E on B. rodhaini in mice, **403**; piroplasmosis in man, **739**; B. moshkovskii from a crow in Pakistan, **1408**; piroplasmosis in Macedonia, **1751**; blood parasites from elephants and porcupines in the Cameroons, **3547.**
Cattle. Babesia species in cattle in Europe, **738**; in Slovakia, **1034**; **3930**; in Macedonia, **1751**; localization of piroplasms at different stages of infection, **2102**; haemosporidial infections in Moscow, **2103**; tick eradication for control, **3931**; Texas fever in Czechoslovakia, **3932.**
See also Babesia Infection, treatment.
Dogs. Pyraldin treatment, **2097.**
Horses. In Macedonia, **1751.**
Sheep. Immunization, **2104**; mixed Anaplasma-Babesia infection, **2110.**
See aslo Babesia Infection, treatment.
Treatment. In cattle and sheep with "berenil", **81**; chemotherapy in the U.S.S.R., **740**; chemoprophylaxis in some animal haemosporidial infections, **1490**; in cattle in Brazil, **1760**; pyraldin for dogs, **2097**; antrycide and berenil treatment in cattle, **2810**; **2811**; non-specific therapy in cattle, **3933.**
BABESIA MAJOR. See Babesia Infection, cattle.
BABESIA MOSHKOVSKII. See Babesia Infection, general.
BABESIA RODHAINI. See Babesia Infection, general.
BACILLUS ANTHRACIS INFECTION (ANTHRAX). Studies, **653**; Pathogenesis, after respiratory spore infection, **323**; differentiation by bacteriophage, **655**; agar diffusion method for titrating antigen, **656**; intracutaneous infection in rodents, **1305**; symposium on immunization, **3478**; adsorbed live vaccine for sheep, **1306**; aluminium hydroxide vaccine, **1307-1309**; sodium sulphate vaccine, **1310**; alum-precipitated antigen or spore vaccine for cattle, **1661**; Tsenkovskii's second vaccine, **1662**; effect of metabolite analogues on growth and virulence in g.pigs, **1664**; titration of antiserum in hamsters, **1663**; fluorescein-labelled antibody, **2001**; toxin production in vitro, **324**; environmental and biological changes in media during growth and sporulation, **3086**; differential diagnosis from B. cereus and B. cereus var. mycoides, **3479**; sensitivity of brain in hyperimmunized rabbits, **3821**, sterilization in tannery waste by composting, **654**; cutaneous, in cattle in Mysore, **2385**; in dogs, **1659**; **1660**; in Slovakia, **974**; in Sweden, **1304.**
See also Encephalitis, General.
BACILLUS CEREUS. Study of germinating spores by television and electron microscopy, **1311**; differential diagnosis from B. anthracis, **3479.**
See also Bacteria General.
BACILLUS MEGATHERIUM. See Bacteria, General.
BACILLUS SUBTILIS. Environmental and biological changes in media during growth and sporulation, **3086.**
BACTERIA, GENERAL. Biochemistry of bact. cell wall, **62**; digestibility and biological value of bacteria, **519**; initiation of transformation, **714**; submicroscopic structural features, **1021**; bact. pyrogens, **2074**; classification, **2076**; application of computors to taxonomy, **2077**; Septicaemia caused by anthrax-like organisms, **3087**; H_2S production, **3168**; Gram reaction and cell composition, **3169**; national collection of type cultures, **3192**; toxicity of calf meal contaminated with a bacillus related to B. megatherium and cereus, **3378.**
See also Antibiotics, General; Books, bacteriology; Disinfectants, Antiseptics and Sterilization; L Forms, Bacterial; Milk and Milk Products, hygiene; Penicillin; Semen and Spermatozoa, general; Technique, staining; Ultrasonic Waves.
BACTERIOPHAGE. Effect of zymosan on clearance, **1457**; book, **3808.**
See also Bacillus Anthracis Infection; Brucella Group; Staphylococcus Infection, general; cattle; Streptococci, General.
BACTERIUM AEROGENES. As cause of bovine mastitis, **3110.**
BACTERIUM ANITRATUM. Production of an ornithosis—related antigen, **464.**
BACTERIUM COLI. See Escherichia Coli.
BACTERIUM PYOSEPTICUM (VISCOSUM). See Bacterium Viscosum Equi.
BACTERIUM VISCOSUM EQUI. See Swine Fever, general.
BALANOPOSTHITIS. See Genital System, prepuce.
BALANTIDIUM. Human diarrhoea, case report from Northern Ireland, **2113.**
BARBITURATES. See Clostridium Tetani Infection.
BASUTOLAND. See Poisoning, plants.
See Poisoning, plants.
BATS. See Encephalitis, General; Encephalitis, Japanese B; Rabies, general.
"BAYER 21/199". See Anthelmintics, for cattle; for sheep; Parasiticides, phosphorus compounds.
"BAYER 205" [SURAMIN]. See Trypanosoma Infection, treatment.
"BAYER L13/59". See Parasiticides, general.
B.C.G. See Mycobacterium Tuberculosis Infection, immunology.
BECHUANALAND. See Ticks, Ixodidae.
BEHAVIOUR OF ANIMALS. Higher nervous activity in cattle, **637**; browsing and reproductive behaviour in East African dwarf goats, **1972**; grazing habits of zebu steers in high altitude temperate climate, **3063**; sexual behaviour and vaginal cycle in cats, **3778**; mating behaviour of cocks, **3801**; aggressiveness and egg production in hens, **3802**; effect of hypothalamic lesions on sexual behaviour and oestrous cycle in ewes, **4121**; differences in higher nervous activity in hens of different breeds, **4155.**
See also Surgery, in dogs; Vitamins, general.
BELGIAN CONGO. See Congo.

BELGIUM. See Hepatitis, Duck Virus; Reports; Salmonella Group; Sterility, cattle.
BENZENE HEXACHLORIDE. See Parasiticides, chlorinated hydrocarbons.
BEPHENIUM EMBONATE. See Anthelmintics, for sheep.
BERENIL. See Babesia Infection, treatment; Françaiella; Theileria Infection; Trypanosoma Infection, treatment.
BETA-AMINOPROPIONITRILE (LATHYRUS FACTOR). Haemorrhagic syndrome in fowls, **569**; teratogenic effect in chick embryos, **892**; lathyrism, **1901**; causing haemorrhages in chicks, **1907**; causing aortic rupture in poults, **2195**.
BETA GLOBULINS. See Immunology, general.
BETA-PROPIOLACTONE. See Immunology, vaccines.
BILE. See Liver.
BILIRUBIN. See Fatigue.
BINTURONG (ARCTITIS). See Mycobacteria, General.
BIOCHEMISTRY. See Books, chemistry and biochemistry.
BIOMPHALARIA. See Schistosoma.
BIOMYCIN. See Leptospira Infection, general.
BIOPSY. See Genital System, testicles; Technique, collection of body tissues and fluids.
BISON. See Brucella Infection, general.
BLACKHEAD. See Histomonas Meleagridis Infection.
BLACKQUARTER. See Clostridium Chauvoei Infection.
BLASTOMYCES INFECTION. Visceral, in a dog, **3172**.
BLINDNESS. See Eyes, diseases.
BLOAT. Surface active agents and other factors affecting surface tension and pH of rumen fluid, **511-512**; exp. production by intraruminal application of egg-white, **513**; frothing, surface tension and viscosity of rumen contents associated with changes from lucerne hay to fresh legumes, **514**; prevention and treatment, **846**; **1504**; **2228**; **2229**; **2560**; **2938**; **2939**; **2940**; **3308**; **3309**; **3310**; **3662**; excessive froth formation as cause of, **847**; bloat in cattle on red clover, **1158**; **1841**; **1842**; investigations, **2227**; prevention by whale oil, and effect on flavour of dairy products, **2228**; prevention and treatment with vegetable oils, **2229**; feedlot studies, **2230**; dissimilation of alfalfa saponins by rumen bacteria, **2231**; silicon control of foamy bloat, **3308**; effect of oil and penicillin on incidence and severity, **3309**; peanut oil, **3310**; measurement of foaming properties of surface active agents, **3661**; exp. study, **4047**.
BLOOD.
General. Chemistry and haematology in sheep on low nutritional intake, **189**; haematological and histological changes induced by A.C.T.H. and formaldehyde, in fowls, **234**; antiproteolytic activity of bovine blood, **268**; effect of CO_2 immobilization on bleeding in fowls, **633**; haematology in calves and adult cattle, **1202**; determination of circulation time in horses, **1554**; book, blood and bone marrow patterns, **2377**; bactericidal properties of bovine blood, **2448**; bactericidal activity of normal serum, **2751**; haematology in lysine deficient swine, **2945**; blood values in beagles, **3027**; haemorrhage of unknown origin in pigs, **3704**; effect of low temp. on some blood properties in sheep, **3745**.
See also Circulatory System; Embryos, Mammalian, and Foetuses; Encephalomyelitis, Equine; Iron; Mycobacterium Tuberculosis; Poisoning, inorganic; organic; Radiations; Sex Hormones, oestrogens.
Coagulation. Of human blood, **596**; of horse blood, **596**; **4113**; prothromboplastin activity, **597**; life span of thrombocytes and erythrocytes in normal and anaemic calves, **2615**; review, **3365**; alterations in blood coagulation system by bact. endotoxins, a generalized Shwartzman reaction, **3525**; **3526**; prevention of generalized Shwartzman reaction with sodium warfarin, **3527**.
See also Manganese.
Composition. Blood values in cattle with paraplegia, **3354**; in camels in Tunisia, **3744**; glucose, blood and plasma of domesticated animals, **197**; blood sugar conc. during starvation in the newborn calf and foal, **520**; glucose, ketone bodies and fatty acids content in cows, **545**; estimation of acetone in samples, **546**; effect of blood sugar changes on rumen motility in sheep, **1930**; necessity of insulin and glucagon for maintenance of normal glycaemia in ducks, **2646**; volatile fatty acids in ruminants, **3668**; Sulkowitch test of urine for determination of calcium in bovine serum, **199**; calcium levels in cows with milk fever after calcium borogluconate inj., **216**; effect of vitamin D_2 on calcium and inorganic phosphorus content in horse serum, **582**; plasma electrolytes of pregnant and foetal sheep, **3333**; sodium and potassium movement in sheep r.b.c. **4111**; variations in normal Na, K, and Ca levels in rats, **1928**; calcium and phosphorus content of serum, **4056**; copper content of whole and citrated ox blood, **1860**; serum inorganic iodine levels after oral iodide dosage, and copper retention, **1226**; acid soluble phosphate fractions, **3412**; serum lipids in dogs, **3746**; serum protein in pigs, **225**; **2189**; changes in serum protein levels in parturition, in cows, **623**; lipophosphoprotein complex in fowl plasma, **1250**; lymphoid tissue and serum gamma globulin in germ-free chicks, **1467**; effect of ultraviolet irradiation on electrophoretic pattern of rabbit serum, **2318**; bovine serum electrophoresis, **2319**; **2896**; age related changes in plasma proteins of foetal goats, **3414**; glycoproteins in horse, cattle, sheep and pigs, **3415**; serum electrophoresis in haemoflagellate infections, **3544**; concentration of non-protein, urea, and amino acid nitrogen in maternal and foetal blood, **4110**; heated glycerol for serum protein evaluation by paper electrophoresis, **3670**; origin and removal of blood ammonia formed during glycine infusion, effect of L-arginine, **1854**; monoamine- and polyphenoloxydase in fowl, cattle and pig serum, **252**; lacticodehydrase content in myopathies, **2994**; diagnostic value of serum transaminase in hepatic and gastro-intestinal diseases, **3372**; rumen function and plasma spermine oxidase, **3410**.
See also Alpacas, Llamas and Vicuñas; Calcium; Dictyocaulus; Eggs, Hen; Fatigue; Immunology, allergy and anaphylaxis; complement and complement fixation; Iron; Ketosis; Magnesium; Mycobacterium Tuberculosis Infection, general; Neoplasms, general; Parasiticides, phosphorus compounds; Phylloerythrin; Pneumonia, General; Proteins; Radiations; Salmonella Gallinarum Infection; Sex Hormones, oestrogens; progesterone; Swine Fever; Vitamins, general, vitamin C; White Muscle Disease.
Corpuscles (red). Total volume, production and destruction, **558**; catalase activity in dog r.b.c., **913**; electrolyte conc. in goat and ox r.b.c., **1244**; haemoglobin and erythrocyte content in cattle with reference to age, **1555**; correlation between packed cell volume and red cell number in dogs, **1890**; effect of cobalt on erythropoiesis, **1929**; life span of thrombocytes and erythrocytes in normal and anaemic calves, **2615**; sedimentation rate in fowls, **2644**; effect of acute protein deprivation on erythropoiesis in rats, **2943**; labelling with radiophosphorus, **3065**; adsorption of bacterial polysaccharides, **3111**; selenoid (crescent) bodies, **3367**.
See also Blood, composition; haemoglobin; Poisoning, inorganic.
Corpuscles (white). Behaviour of phagocytes on exposure to tubercle bacilli, **334**; incorporation of labelled leucine into normal and leucaemic w.b.c., **504**; eosinopenia produced by ACTH. and corticoids in horses, **584**; eosinophile count in calves, **598**; osmotic resistance, **599**; sex difference in dog neutrophiles, **914**; sex difference in mouse eosinophiles, **915**; effect of adrenaline, ACTH and insulin on circulating eosinophiles in cows, **2258**; factor in oestrogen-treated uterus responsible for leucocyte emigration, **3050**.
See also Anaemia, Equine Infectious; Blood, coagulation; transfusion; Genital System, ovaries, ova and ovulation; Growth, growth factors; Mycobacterium Tuberculosis Infection, tuberculin test.
Groups. And haemolytic disease of new-born piglets, **465**; in farm animals, **2191**; examination of bovine serum and saliva for soluble blood group substances, **2520**; in horses and mules, **2895**; **3609**; abortion in mares due to serological incompatibility of blood groups, **3985**; J substance from bovine gastric mucosa, **3986**; in swine, **3987**; determination of ABO and Rh(D) groups, **4159**.
See also Blood, transfusion; Escherichia Coli Infection, general.
Haemoglobin. Haemoglobins in British cattle, **912**; haemoglobins in the horse, **2645**; haemoglobins in sheep, **1593**; **2317**; haemoglobin content and erythrocyte count in chicks, **1241**; haemoglobin and erythrocyte content in cattle, **1555**; postnatal synthesis of foetal haemoglobin in goats, **1594**; iron content in iron deficiency, **2584**; refractometric determination in rat r.b.c. by phase contrast microscopy, **3366**.
Haemolytic diseases. See Haemolytic Disease of New-Born.
Picture. And bone marrow picture in piglet anaemia, **206**; in pigs, receiving cobalt supplements, **3321**; normal, in cattle and dogs, **2643**.
See also Brucella Infection, immunology; Mycobacterium Tuberculosis Infection, tuberculin test; Myxomatosis; Swine Fever, African.
Pressure. In sheep, **1242**; in turkeys, **2276**; in fowls deprived of choline, **2571**; estimation in rats by tail oscilloscope, **2642**; bradycardia and blood pressure in foetal lambs, **3418** **3419**; graphical recording of systolic and diastolic pressure in animals, **3715**.
Transfusion. Pathology of sequelae in cattle, **1468**; bact. contamination of blood for transfusion, **1727**; cutaneous response to autologous and non-autologous plasma, **2184**; plasma incompatibility in dogs, **2897**; leucocyte agglutinins and blood transfusion, **3730**.
See also Blood, groups.
Volume. And environmental temp., in cows, **590**; determination in horses, **2641**; in calves, **1238**; **3411**.
See also Blood, corpuscles (red).
BLOOD-BRAIN BARRIER. Effect of endotoxin, **2401**.
BLOWFLIES & FLESHFLIES. Control, **789**; **1088-1089**; **3269**; resistance of L. cuprina to dieldrin, **2523**; frequency of mating of L. cuprina, **2524**; ovarian development and mating of L. cuprina, **3612**.

"BLUE COMB". See Pullet Disease.
BLUETONGUE. Vaccination of lambs, 2145; in the U.S.A., 2852; in Spain, 3230.
BODY-STRIKE. See Blowflies and Fleshflies.
BONES.
General. Diaphragmatic, in camels, 917 & 918; diaphyseal bone in calf and foal, 1937; ossification of the foot in dogs, 2325; ultrastructure and function, 2648; arrested growth lines in pigs on low-protein diets, 2942; extraction of osteogenic factor from bone, 3752; density studies, 4119; influence of age on calcification and phosphorus inclusion, 4120; effect of uterine environment on skeletal morphology in mice, 4140.
See also Calcium; Growth, growth factors; Sex Hormones, oestrogens; Strontium; Swine Fever; Tissue Culture; Vitamins, vitamin D.
Diseases. Chronic osteomyelitis in young dogs, 230; action of adenosine triphosphate on alkaline phosphatase in callus of fractures, 249; osteoporosis in lambs in a mining area, 552; osteodystrophia fibrosa accompanied by visceral accumulation of lead, 1869; fractures of third phalanx in cattle, 2266; rachitomimetic effect of sodium fluoride on skeletal tissue of growing pigs, 2618; "kraff" (osteomalacia?) in camels, 2980; osteomalacia in horses, 3339; 4061; histopathology of rickets and osteodystrophy in young pigs, 3340; sex-linked hyperostosis in parakeets, 3451; ovine double scaup, 3659; short-headed dwarfism in Hereford cattle, 3753.
See also Mycobacterium Tuberculosis Infection, general; Neoplasms, in dogs; Nutrition and Metabolism, sheep; Poisoning, inorganic; Radiations; "Stringhalt"; Vitamins, vitamin A; vitamin C.
Marrow. Bone marrow and blood picture in piglet anaemia, 206; myelopoiesis studied by i/v inj. of S. typhi vaccine in dogs, 256; book, blood and bone marrow patterns, 2377.
See also Leucosis, cattle; dogs; Poisoning, inorganic; organic.
BOOKS.
Anatomy. Anatomy, histology and embryology of farm animals [in R.], 965; Anatomy of domesticated animals [in R.], 1294.
Bacteriology & bact. disease. Précis of medical bacteriology [in Fr.], 309; The life of bacteria, 310; Annual review microbiology, vol. 11, 311; Aids to bacteriology, 1286; Immunization against TB. in man [in G.], 1287; Biology, classification and nomenclature of the viridans group of Streptococci [in G.], 1986; veterinary microbiology [in Bulg.], 2452; Manual of microbiological methods, 2706; Tuberculosis in animals and man, 3462.
Biology. Polysaccharides in biology. Transactions of conference, 4162.
Chemistry & Biochemistry. Introduction to general biochemistry [in Fr.], 966.
Diseases, general. Infectious and invasive diseases of cattle [in R.], 313; Comparative aspects of haemolytic disease of the new-born, 644; Diseases of farm livestock. Section VI. The husbandry and diseases of calves, 645; Infectious diseases of domestic animals, 960; Veterinary practice [in Fr.], 961; Sheep husbandry and diseases, 1290; Handbook of poultry diseases [in G.], 1291; Treatise of diseases of birds [in Port.], 1292; Advances in veterinary science, 2379; Diseases of domestic animals in New Zealand, 2709; Veterinary ophthalmology, 2710; Diseases and parasites of poultry, 2711.
See also Books, heredity; pathology; zootechny.
Embryology. Anatomy, histology and embryology of farm animals [in R.], 965; Foundations of, 4163; Borderland of embryology and pathology, 4164.
Endocrinology. Biochemical contributions to endocrinology. Experiments in hormonal research, 1989.
Food hygiene. Textbook of meat inspection [in G.], 967; Textbook of food inspection [in G.], 968; Microscopy of meat and animal products [in Cz.], 969; Ostertag's textbook for meat inspectors [in G.], 3811; Abattoirs, their functions, technology, construction and administration [in G.], 3812.
Heredity. Genetic resistance to disease in domestic animals, 3809.
See also Books, reproduction; zootechny.
Meat Inspection. See Books, food hygiene.
Miscellaneous. Technique of P.M. examination of domestic animals [in G.], 314; Modern methods of microscopy, 318; Robert Bakewell. Pioneer livestock breeder, 1297; Evolution of the veterinary art. A narrative account to 1850, 1298; Index of agricultural research, 1299; The physician-writer's book. Tricks of the trade of medical writing. 1300; Index of agricultural research institutions in Europe, 1642; Advances in pest control research, 1647; Guide to veterinary bibliography and to the veterinary doctorate [in Fr.], 1979; World catalogue of veterinary teaching establishments [in G.], 1992; Pig carcass evaluation, 2713; Proceedings of 2nd Congress of the German Veterinary Medical Association, 3467; History of veterinary science [in It.], 4166.
Mycology. A glossary of mycology, 2375; Mycoses of man and animals, 2707.
Nutrition. Swine feeding and nutrition, 315; Vitamin B_{12} and antibiotics in animal nutrition. Annotated bibliography, 518; Animal nutrition. I. General aspects [in Fr.], 1289; Breeding, nutrition and husbandry of farm animals [in G.], 1296; Vitamin B_{12} in animal nutrition, 3344; Handbook of feedstuffs, 4161.
Parasitology. Infectious and invasive diseases of cattle [in R.], 313; Helminths and helminth infestations of pigs [in G.], 958; Fleas, flukes and cuckoos. A study of bird parasites, 1288; Advances in pest control research, 1647; Guide to molluscan anatomy for parasitologists in Africa, 1648; Manual of parasitic mites of medical or economic importance, 2531; Diseases and parasites of poultry, 2711; Diagnosis of parasitic diseases of domestic animals [in Hung.], 3463.
Pathology. Veterinary pathology, 959; Atlas of muscle pathology in neuromuscular diseases, 1649; New pathways in cellular pathology, 3464; Borderland of embryology, 4164.
Pharmacology & therapeutics. Veterinary anaesthesia, 1293; British pharmacopoeia 1958, 2301; New and non-official drugs, 2712; Strategy of chemotherapy, a symposium, 3465; British national formulary 1957. First amendment 1958, 4165.
Physiology. Handbook of animal physiology, 963; The adrenal cortex, 964; The alimentary tract of ruminants, 1295; Blood and bone marrow patterns, 2377; Liver: structure and function, 2378.
Protozoology. Veterinary protozoology, 2376; Symposium on trichomonad infections [in Fr.], 2708.
Reproduction. Gestation. Transactions of conferences, 316; 4167; Veterinary obstetrics [in Fr.], 317; Studies on fertility, 970; Breeding problems and artificial insemination, 3076; Physiopathology of reproduction and artificial insemination in domestic animals [in It.], 3466; Bird hybrids. A check list with bibliography, 3468.
See also Books, embryology; zootechny.
Surgery. Canine surgery. A text and reference work, 646.
Toxicology. Veterinary toxicology, 962.
Viruses & Rickettsia. Annual review of microbiology, vol. 11, 311; Diagnostic procedures for virus and rickettsial diseases, 312; Virus—the story of borrowed life [in G.], 1987; Veterinary microbiology [in Bulg.], 2452; Bacteriophage [in G.], 3808.
Zoology. Guide to molluscan anatomy for parasitologists in Africa, 1648; Man as an animal, 3469.
Zootechny. Breeding and improvement of farm animals, 971; Sheep husbandry and diseases, 1290; Breeding, nutrition and husbandry of farm animals [in G.], 1296; Avian pathology and hygiene of poultry farming [in It.], 1988; Breeding, feeding and disease of sheep [in Fr.], 1990; The UFAW handbook on care and management of laboratory animals, 1991; Indigenous cattle of the British dependent territories in Africa, 3077; Livestock improvement in relation to heredity and environment, 3810.
See also Books, heredity; miscellaneous; reproduction.
BOOPHILUS. See Ticks, Ixodidae.
BORNA DISEASE. Cultivation in chick embryos, 419; inclusion bodies in lab. animals, 757; soluble antigen and infection of young rabbits, 2139; c.f. test, 2841; epidemiology, diagnosis and treatment, 3224.
See also Encephalomyelitis, Equine.
BORRELIA. Trans-ovarian passage of B. duttoni in O. moubata, 4005.
BOTULISM. See Clostridium Botulinum Intoxication.
BOWEL OEDEMA. See Oedema Disease of Pigs.
BOWIE. See Nutrition and Metabolism, sheep.
BRACKEN. See Poisoning, plants.
BRADSOT. See Clostridium Infection, sheep and goats.
BRAIN. See Nervous System.
BRAIN-LIVER SYNDROME OF HORSES. See Liver, diseases.
BRAZIL. See Anaplasma Infection; Babesia Infection, treatment.
BREEDING. See Zootechny.
"BRISKET DISEASE". See Altitude.
BRITISH ANTI-LEWISITE (B.A.L.). See Poisoning, inorganic.
"BROKEN WIND". See Respiratory System, diseases.
BROMOCHLOROTRIFLUOROETHANE ("FLUOTHANE"). Pharmacology, 248.
BROMSULPHALEIN TEST. See Liver, general.
BRONCHITIS, AVIAN INFECTIOUS. Epidemiology, pathology, and causative agent, 140; effect on baby chicks, 141; modification of vaccination programme, 441; isolation of virus and vaccination, 774; response of pullets to a vaccinal virus, 1077; effect on reproductive system, 1078; immunity and serum-neutralization titres, 1444; evaluation of immunity, 1445; electron microscopy of infected chorioallantoic membrane, 1788; immunological differences of strains, 1789; influence of temp. on virulence and growth of virus in eggs, 2504; effect of Ascaridia

BRONCHITIS, AVIAN INFECTIOUS—[cont'd.]
galli on infected chicks, 2608; spectrophotometric and serum neutralization studies, 3597.
BRONCHITIS, BOVINE INFECTIOUS. See Pasteurella Infection, cattle.
BRONCHITIS, PARASITIC. See Lungworms.
BRONCHO-PNEUMONIA, GENERAL. See Respiratory System, diseases.
BRUCELLA GROUP. Use of embryonated eggs in research, 38; determination of urease activity, 41; hydrolytic enzymes and typing, 369; determination of virulence, 696; 998; factor protecting viability of lyophilized Br. abortus, 701; survival of Br. abortus in manure, 1003; new species from desert wood rat, 1010; 2048; lipase activity, 1015; bacteriophage, 1016; mixed Br. abortus and M. tuberculosis cultures, 1352; dye-sensitive Type II from cows' milk, 1354; growth in presence of blood, 1359; dissociated forms, 1360; endotoxins, 1362; selective medium, 2050; cytochrome oxidase content, 2051; concept of species, 2052; vortex aeration culture apparatus, 2415; transformation of varieties, 2418; typing of strains from Italy, 2763; spontaneous and induced reversion to S forms, 3138; carbon dioxide requirements and virulence, 3139; carbohydrate utilization, 3142; differentiation of strains from slaughter cattle, 3504; antigenic structure of Br. suis, 3510; effect of antibiotics on metabolism of strains, 3872-3877; antigenic structure, 3878; nutrition, 3879.
BRUCELLA INFECTION.
General. U.S. federal eradication programme, 1696; review of Russian work, 1358; in bison, elk and moose, 2038; in buffaloes, 691; in deer, 1724; in hares, 703; 999; 1000; 2047; 3867; spontaneous Br. intermedia infection in rabbits, 2761; in desert wood rats, 1010; in wild rats, 1014; in man in Poland, 42; 1705; 2413; a danger for the veterinarian, 1365; Br. suis infection in a child, 1366; chronic human infection in rural practice, 1367; dermatological aspect in man, 1368; in man with Strain 19, 1001; 1002; 3509; resistance of g.pig skin to infection, 700; meat inspection aspects, 995; environmental investigations, 2412; pathogenesis of Br. suis infection in g.pigs, 2757; host-parasite relationship, 3866; isolation from cows' milk, 694; viability in cheese, 1703; persistence and pathogenicity in cream, 3141.
Avian. Cross-agglutination between Brucella and S. pullorum, 2422.
Cattle. Control, 365; 3501; control in Italy, 3863; control in cattle and pigs, 3865; role of arthropods in transmission, 695; in lymph nodes, 994; eradication in Scandinavia, 3129; types isolated from cattle in Schleswig-Holstein, 3132; incidence in immunized herds, 3133; isolation from semen, 3503; electrophoresis of serum from healthy, infected and immunized cattle, 3505.
See also Brucella Infection, general; diagnosis; immunology; treatment.
Diagnosis. Milk plate-test, 36; 3130; whey plate test, 366; 992; 3861; milk ring test, 2414; 2752; ring and plate milk agglutination test, 3130; milk flocculation test, 1699; capillary test for screening quarter samples, 362; cup test for screening infected g.pigs, 368; blood and whey tests, 991; tetrazolium-stained antigen, 1351; surface fixation test, 1697; standardized test suspensions, 1700; opsono-cytophagic test, 2039; 3502; cold and quantitative micro-c.f. tests, 3131; doubtful haemagglutination reactions in cattle, 693; serological semen tests in a bull, 990; serological, in bulls, 692; flocculation and serum ring-test in immunized herds, 1350; agglutination titre of fresh cattle blood, 1698; serological, in sheep, 1005; 1363; 2044; allergic, in sheep, 697; 1008; detection of latent infection in sheep, 1364; agglutination test in sheep with 10% NaCl, 1006; in goats, 1012; 1013; lack of correlation between skin test and tissue sensitivity in g.pigs, 2040; skin test and precipitation of serum with non-agglutinogenic fraction, 2753.
See also Brucella Infection, immunology.
Immunology. Allergens, 993; activity of hydrolysates, 1007; agglutinative substances in immune serum, 3137; avirulent strains, 997; incomplete antibodies, 37; 2049; interactions between mononuclear phagocytes and Br. abortus strains, 2755; mechanism of immunity, 2417; filtrable form of Strain 19, 1356; value of live, heat-killed and adjuvant Strain 45/20 and 19 vaccines, 1355; infection in man with Strain 19, 1001; 1002; 1704; 3509; Strain 19 and other vaccines, 3508, 3871; Strain 19 therapy, 363; effect of vaccination on rectal temp. in calves, 367; blood picture of calves immunized with Strain 19, 1701; method of inj. Strain 19, 2041; immunity from Strain 19, 2042; 3507; dependence of titre on number of bacteria in Strain 19 vaccine, 2416; serology in cattle vaccinated with Strain 19, 3862; differentiation of immunization and infection titres in cattle, 1353; 1702; 3134; 2754; Strain 19 for sheep, 699; 1004; immunization of sheep, 698; 2045; vaccination against Br. ovis infection in sheep, 371; presence of Q fever and brucella antibodies in ovine serum, 2263; antibodies in sheep following intradermopalpebral test, 1011; Br. melitensis vaccines for goats, 1706; 1707; 1708; 2421; 3868; Italian Br. melitensis vaccine, 3869; adsorbed Br. melitensis vaccine tested in g.pigs, 2760; Huddleson's vaccine, 1357; 3506; immunization of rats, 2046; effect of Br. suis antigen on spleen culture from normal and infected g.pigs, 2420; production of strains with immunogenic capacity, 3136; production of monospecific antibodies, 2762; preparation of monospecific Br. abortus and Br. melitensis serum, 3511; immunizing properties of Br. abortus attenuated with antibiotics, 3864; skin test and serum precipitation with non-agglutinogenic fraction of Br. abortus, 39; influence of saline conc. on the agglutination test in pigs, 40.
Sheep & goats. A review, 3146; meat inspection aspect of infected sheep carcasses, 370; vaccination of sheep against Br. ovis, 371; 3148; semen of rams with epididymitis, 1009; in Italy, 2758; exp. studies in sheep, 3143; 3144; in goats, 3145; Br. intermedia in sheep in Czechoslovakia, 3147; lab. diagnosis of ovine epididymitis, 3149.
See also Brucella Infection, diagnosis; immunology; treatment; Brucella Tularensis Infection.
Swine. A review, 3140; incidence, 1361; brucella epididymitis and orchitis in pigs, 1723; isolation of Br. suis in Poland, 2043; infection with Br. abortus, 3135; control in cattle and pigs, 3865.
See also Brucella Infection, immunology.
Treatment. Chlortetracycline and immune serum treatment of sheep, 364; vitamin K for sheep and goats, 702; serotherapy in cattle, 996; in cattle with "Pecudin" ("SR 692"), 2419; terramycin, 2756.
BRUCELLA INTERMEDIA. See Brucella Infection, general; sheep and goats.
BRUCELLA MELITENSIS INFECTION. Cross immunity between Br. melitensis and M. tuberculosis, 386; in sheepdogs, 2759; novobiocin in Malta fever, 3870.
See also Brucella Infection, immunology; sheep and goats.
BRUCELLA OVIS. See Brucella Infection, immunology; sheep and goats.
BRUCELLA SUIS. See Brucella Group; Brucella Infection, general; immunology; swine.
BRUCELLA TULARENSIS INFECTION. Survival in frozen sheep carcasses, 372; disinfection of infected grain and forage, 1709; "Past. pseudotularensis" infection in a rabbitry, 2027; flocculation test, 3512.
BUDGERIGARS (MELOPSITTACUS). See Bones, diseases; Mange, general.
BUFFALOES. See Brucella Infection, general; Genital System, vagina and vulva; Neoplasms, general; in cattle; "Penjakit Ingusan"; Paramphistomum; Pox Diseases; Respiratory System, general; Sarcosporidiosis; Setaria; Sterility; Temperature, body; Theileria Infection; Trichuris.
BULGARIA. See Fasciola; Newcastle Disease, immunology; Services, Veterinary.
BULINUS. See Schistosoma.
BUNOSTOMUM. See Anthelmintics, for cattle.
BUTOXY POLYPROPYLENE GLYCOL. See Parasiticides.

C

CADMIUM COMPOUNDS. See Anthelmintics, general; for swine.
CAECUM. See Digestive System.
CAESARIAN SECTION. See Surgery, in cattle; in sheep; in swine.
CAESIUM. Metabolism in swine, 4060.
See also Milk and Products, hygiene; Radiations.
CAGEBIRDS. Management and diseases, 2275.
See also Bones, diseases; Mange, general.
CALCIFEROL. See Vitamins, vitamin D.
CALCIUM. Influence of vitamin D on Ca metabolism, 200; effect of lysine and other factors on absorption, 201; blood levels and urinary excretion in milk fever, 216; effect of adequate and excessive amounts on calves given adequate P, 1168; Ca and Mg metabolism in calves, 1169; radiocalcium metabolism in blood, bones and young of lactating rats given oestradiol, 1185; metabolism in dairy cows, 1522; determination in biological material, 1857; 1858; hypocalcaemia in starving cows, 2245; 2246; interrelation of Ca and citrate metabolism, 2577, soft tissue calcification in g.pigs, 2590; adaptation to different intakes in dogs, 2952; hypocalcaemia in cats, 2953; effect of parenteral application of salts in cattle, 3008; effect of lactose on retention in rats, 3320, metabolism, 4055.
See also Blood, composition; Circulatory System, heart; Eggs, Hen; Embryos, Mammalian, and Foetuses; Grasses; Milk Fever; Nutrition and Metabolism, sheep; Parakeratosis; Sex Hormones, oestrogens; Soil; Trichostrongylus; Urinary System, calculi; Zinc.
CALCIUM ACETYLGLUTAMINATE. Pharmacology, 3007.
CALCIUM DISODIUM VERSENATE. See Poisoning, inorganic.

CALCIUM EDETATE. See Poisoning, inorganic.
CALCULI. See Urinary System.
CALIFORNIA TEST. See Mastitis, Bovine, diagnosis.
CALLITROGA. Screw-worm control, **3613**; effect on g.pigs, **3614**.
CALVES. See Cattle.
CAMBODIA. See Rinderpest.
CAMELS. See Blood, composition; Bones, diseases; Diaphragm; Haemonchus; Mycobacterium Johnei Infection; Salivary Glands; Trypanosoma Evansi Infection.
CAMEROONS. See Babesia Infection, general.
CANADA. See Copper; Leptospira Infection, cattle; Lungworms; Pasteurella Infection, cattle; Pneumonia, General; Reports; Ticks, Argasidae.
"CANCER EYE". See Neoplasms, in cattle.
CANDIDA ALBICANS INFECTION (MONILIASIS). "Thrush" in a piglet, **389**; rapid identification in clin. material, **1732**; comparative effect of chlortetracycline and cortisone on local moniliasis in mice, **2442**; C. albicans as cause of septic retinitis, **2791**; exp., in mice, **3899**.
CANDIDA INFECTION. C. tropicalis as cause of bovine mastitis, **56**; **717**; nystatin for prevention of moniliasis in laboratory chicks, **1390**.
CANICOLA FEVER. See Leptospira Infection.
CAPILLARIA. In the spleen of a rat, **1107**; in fowls, **1108**; treatment in pheasants with CCl_4, **1109**.
CARBAMIDE. See Poisoning, therapeutics and agricultural chemicals.
CARBAMOYL ALKYL PHOSPHORODITHIOATES. See Parasiticides, phosphorus compounds.
CARBOHYDRATES. See Digestive System, ruminant digestion; New-born Animals; Nutrition and Metabolism, swine.
CARBOMYCIN. See Leptospira Infection, general.
CARBON DIOXIDE. Effect of CO_2 on bleeding in fowls, **633**.
CARBON TETRACHLORIDE. See Anthelmintics; Poisoning, therapeutics; Semen and Spermatozoa, general.
CARCASSES. See Death; Knackeries; Weight, body.
CARCINOGENIC COMPOUNDS. See Neoplasms, causation.
CARCINOMA. See Neoplasms, general; in cattle; in dogs; in horses.
CARICIDE (DIETHYLCARBAMAZINE ACID CITRATE). See Anthelmintics, for cattle; for sheep and goats.
CARMYERIUS. C. dollfusi in cattle in Madagascar, **795**; **1810**.
CAROTENE. See Vitamins, vitamin A.
CAROTID BODY. See Neoplasms, in dogs.
CARTILAGES. See Bones, general.
CARUNCLES. See Genital System, placenta.
CASEIN, IODINATED. See Thyroid Gland.
CASTRATION. See Sex Hormones, oestrogens; Surgery.
CATALASE. See Blood, corpuscles (red).
CATARACT. See Eyes, diseases.
CATARRH, BOVINE MALIGNANT. Differential diagnosis from listeriosis, **1880**; secondary fungous infection in a cow, **3531**.
CATS. Virus diseases of young cats, **1434**.
See also Anaemia, General; Anafilaroides; Anthelmintics; Behaviour of Animals; Calcium; Column, Vertebral; Enteritis, Feline; Helminth Parasites, General; Leptospira Infection; Microsporum Infection; Mycobacterium Tuberculosis Infection, general; treatment; Neoplasms; Nutrition and Metabolism, general; carnivora; Pneumonitis, Feline; Sex Hormones, oestrogens; Skin, general; Tapeworms; Thyroid Gland; Toxoplasma Infection; Vogeloides; Wuchereria.
CATTLE.
General. See Acclimatization and Climate; Adrenal Gland, cortical hormones; Anaesthesia and Analgesia; Animal Production; Blood, composition; haemoglobin; picture; transfusion; volume; Bones, general; Books, zootechny; Chlorpromazine; Coitus; Diaphragm; Digestive System, intestines; ruminant digestion; Fatigue; Genital System; Glucose; Growth, growth factors; Insemination, Artificial; Magnesium; Mammary Gland; Multiple Births; Nervous System, general; New-born Animals; Parathyroid Glands; Parturition; Pineal Body; Pregnancy, general; diagnosis; Respiratory System, general; Semen and Spermatozoa; Sex; Sex Hormones, gonadotrophins; oestrogens; Skin, general; Surgery; Sweating and Sweat Glands; Teeth; Temperature, environmental; Thyroid Gland.
Arthropod parasites. See Brucella Infection general; Lice; Linguatula; Mange; Oestridae, Dermatobia; Hypoderma; Speleognathus.
Bacterial & fungous diseases. See Actinomycosis; Bacillus Anthracis Infection; Bacterium Aerogenes; Brucella Infection; Candida Infection; Clostridium Botulinum Intoxication, Clostridium infection; Clostridium Tetani Infection; Clostridium Welchii Infection, Dermatophilus Infection; Erysipelothrix Monocytogenes Infection; Escherichia Coli Infection; Fungi, General; Leptospira Infection; Mastitis, Bovine; Mastitis, Mycotic; Mycobacterium Tuberculosis Infection; Pasteurella Infection; Pleuropneumonia, Bovine Contagious; Pseudomonas; Ringworm; Salmonella Infection; Staphylococcus Infection; Streptococcus Infection; Streptothricosis, Cutaneous; Vibrio Fetus Infection.
Diseases, general. Electrolyte treatment of calf scours, acidosis and potassium deficiency, **547**; "neuronopathy" and "pseudolipidosis" in calves, **550**; muscular dystrophy and myopathy-dyspnoea in calves, **870-877**; national survey, **1186**; wastage, culling and disease incidence in dairy herds, **1879**; **3697**; dairy herd wastage in Queensland, **2610**; herd wastage and fertility survey, **3798**.
See also Anaemia, General; Bloat; Bones, diseases; Books; Circulatory System, heart; Clover; Column, Vertebral; Copper; Foot; Foreign Body Syndrome, Cattle; Genital System, diseases; placenta; vagina; Grasses; Haematuria, Bovine Chronic; Heredity; Iron; Joints; Ketosis; Kidneys; Leucosis; Liver, diseases; Milk Fever; Molybdenum; Neoplasms; Parturition; Phosphorus; Pneumonia, General; Poisoning, inorganic; organic; plants; Porphyria; Pregnancy, general; Skin, diseases; Sodium Chloride; "Stringhalt"; Sulphaquinoxaline; Teratology; Trace Elements; Vitamins, vitamin A; White Muscle Disease.
Helminth parasites. Faecal egg count in relation to age and body weight, **3288**; low burden in calves fed on milk, **3635**.
See also Anthelmintics; Books; Carmyerius; Cooperia; Cysticercus; Dictyocaulus; Echinococcus; Helminth Parasites, General; Hyostrongylus; Leeches; Lungworms; Nematodes, General; Nematodirus; Oesophagostomum; Onchocerca; Ostertagia; Setaria; Trichostrongylus; Trichuris.
Protozoan diseases. See Anaplasma Infection; Babesia Infection, cattle; treatment; Eimeria Infection, cattle; treatment; Françaiella; Gonderia Infection; Sarcosporidiosis; Theileria Infection; Toxoplasma Infection; Trichomonas Infection; Trypanosoma Infection, cattle; treatment.
Virus & rickettsial diseases. Cytopathogenic agent from faeces, **1057**; viral agent in shipping fever complex, **1332**; isolation of filtrable agents from cattle, **2481**.
See also Aujeszky's Disease; Catarrh, Bovine Malignant; Diarrhoea, Bovine Virus; Encephalomyelitis, General; Exanthema, Coital; Fever, Bovine Epizootic; Foot and Mouth Disease; Genital System, prepuce; Influenza; Mucosal Disease; "Penjakit Ingusan"; Rabies, general; immunology; Rhinotracheitis, Bovine Infectious; Rickettsia Infection, cattle; Rinderpest; Vaginitis, Bovine Virus.
CELLULOSE. See Digestive System, fauna and flora; ruminant digestion.
CENSUS OF LIVESTOCK. See Statistics.
CEREBROSPINAL FLUID. See Nervous System.
CERVIX. See Genital System, uterus.
CETRIMIDE. Pseudomonas pyocyanea isolated from cetrimide, **22**.
CHESTNUT (CASTANEA SATIVA). See Poisoning, plants.
CHEYLETIELLA. Parasitic habit of C. parasitivorax in rabbits, **1096**.
CHICK EMBRYOS. See Embryo, Fowl.
CHICK EMBRYO LETHAL ORPHAN VIRUS (CELO). A study, **142**.
CHINA. See Encephalomalacia, General; Schistosoma; Services, Veterinary.
CHINCHILLAS. See Neoplasms, general; Nutrition, in relation to disease; Pasteurella Pseudotuberculosis Infection.
CHLORAL HYDRATE. See Anaesthesia and Analgesia, general; in swine.
CHLORAMPHENICOL. Lipids and bact. resistance, **2750**.
See also Escherichia Coli; Pasteurella Infection, avian; Salmonella Infection, in cattle; Theileria Infection.
CHLORDANE. See Parasiticides, chlorinated hydrocarbons.
CHLORINATED NAPHTHALENES. See Poisoning, organic; therapeutics and agricultural chemicals.
CHLOROMYCETIN. See Chloramphenicol.
"CHLOROPHOS". See Oestridae, Hypoderma.
CHLOROQUINE. See Plasmodium Infection.
CHLORPROMAZINE. Sedation in the pig, **576**; diluting effect on circulating blood in dogs, **577**; and reserpine prevention of myocardial damage by histamine and serotonin, **900**; action in calves, **1223**; for examination of penis on bulls, **2342**.
See also Clostridium Tetani Infection.
CHLORTEN. See Parasiticides, toxicity.
CHLORTETRACYCLINE (AUREOMYCIN). Distribution of dihydrostreptomycin and tetracycline in the body, **244**; international standard for tetracycline, **2302**; inactivation of bacteriostatic action by bact. metabolic products, **2441**;

CHLORTETRACYCLINE (AUREOMYCIN)—[cont'd.] influence on liver regeneration after partial hepatectomy, **2631**.
See also Abscesses; Brucella Infection, treatment; Candida Albicans Infection; Diarrhoea, General; Eimeria Infection, treatment; Escherichia Coli; Growth, growth factors; Hygiene, food; Nutrition and Metabolism, in relation to disease; Psittacosis; Respiratory System, general; Rickettsia Infection, in dogs; Salmonella Pullorum Infection; Tetracyclines; Urinary System, calculi; Vibrio Fetus Infection, sheep; Vitamins, vitamin B (nicotinic acid).
CHOLESTEROL. See Eggs, Hen; Fatigue; Vitamins, vitamin A.
CHOLINE. Effect of deficiency on selenium poisoning in rats, **237**.
See also Blood, pressure; Liver, diseases.
CHOLINESTERASE. And muscle relaxants, **899**.
CHOREA. Ethopropazine ("parsidol") treatment in dogs, **228**.
CHORIOPTES. See Mange, cattle.
CHORIORETINITIS. See Eyes, diseases.
CHROMIUM. See Anaplasma Infection.
CHRONIC RESPIRATORY DISEASE OF FOWLS. Complicating factor in C.R.D. and infectious sinusitis of turkeys, **724**; symposium, **3179-3183**; aetiology and pathology, **3184**; review, **3539**; associated viruses, **3598**.
CIRCULATORY SYSTEM.
General. Effect of irradiation on circulation in splenectomized dogs, **559**; measurement of blood flow in dogs, **1242**; blood flow in isolated perfused bovine udder, **1596**; haemodynamic observations in cattle, **3416**; quantitative study of circulation in goats, **3748**; mesenteric thrombosis in horses, **4064**.
See also Blood; Embryos, Mammalian, and Foetuses; Genital System, uterus.
Heart. Prevention of myocardial damage by histamine and serotonin, **900**; heart rate in fowls, **1595**; electrocardiography in dogs, **1887**; **2987**; Ca and heart contraction, **1932**; electrocardiography of auricular fibrillation, **2283**; electrocardiography in horses and cattle, **2971**; functional innervation in sheep, **3030**; cardiac adiposity in cattle, **3700**; haemorrhages of the left ventricle following trauma in goats, **3702**; diagnosis of pericarditis in cattle, **4065**.
See also Encephalomyelitis, Porcine; Foot and Mouth Disease, general; Linguatula; Neoplasms, in dogs; Nervous System, general; Streptococcus Infection, cattle; Thyroid Gland.
Vessels. Blood supply of muscle during exercise, **1977**; pulsation in peripheral arteries, **3747**; vascular events in inflammation, **3893**; **3894**.
See also Dirofilaria; Nutrition, in relation to disease; Onchocerca; Poisoning, plants.
CLAVICEPS. See Poisoning, plants.
CLETHRIONOMYS. See Encephalitis, General.
CLIMATE. See Acclimatization and Climate.
CLOSTRIDIA, GENERAL. Rapid method of separating clostridia from other organisms, **48**; growth of clostridia and mortality from wound infection in goats, **2434**; antigenic formula, **3887**; investigation of toxin in tissue culture, **3889**.
CLOSTRIDIUM BOTULINUM INTOXICATION. Bact. diagnosis, **709**; survival of C beta toxin in silage, **710**; factors affecting toxin production and toxoid evaluation, **2062**; immunization of mink with toxoid, **2433**; enteritis in cattle, **2775**; culture of Type C with controlled pH, **2776**; fluorescence of toxin and toxicity, **2777**; absorption of type A toxin from alimentary canal, **3521**.
CLOSTRIDIUM CARNIS. See Clostridium Infection, general.
CLOSTRIDIUM CHAUVOEI INFECTION (BLACK-QUARTER). Immunity tests in lab. animals, **378**; survival and vegetative growth in soil, **1379**.
CLOSTRIDIUM HAEMOLYTICUM. See Clostridium Infection, cattle.
CLOSTRIDIUM INFECTION.
General. Action of toxins on capillary permeability, **379**; differentiation of clostridia from tinned meat, **380**; requirements for production and germination of spores, **381**; organism resembling C. carnis from mink, **1717**; clostridial diseases of animals, **3158**.
Cattle. Control of bacillary haemoglobinuria, **1716**.
Horses. Properties of sera from horses subjected to series of immunizations and bleedings, **382**.
See also Clostridium Tetani Infection.
Sheep & goats. See Clostridium Welchii Infection.
CLOSTRIDIUM PERFRINGENS. See Clostridium Welchii Infection.
CLOSTRIDIUM TETANI INFECTION (TETANUS). Antitoxin in serum of healthy cattle in Bavaria, **49**; chlorpromazine treatment in horses, **707**; pathogenesis in dogs, **708**; in raw catgut, **1718**; pathogenesis and experimental therapy, **2432**; antitoxin titres in pigs given aluminium hydroxide toxoid, **2773**; neutralization of toxin by homologous antitoxin in mice, **2774**; transfer of immunity from dam to foal, **3159**; comparative trials with chlorpromazine and barbiturates, **3160**; post-surgical tetanus in a dog, **3518**; in parabiotic rats, **3519**; antitoxin titration by haemagglutination, **3520**.
CLOSTRIDIUM WELCHII INFECTION. Experimental enterotoxaemia and stimulation of antitoxin production in immune animals, **45-46**; Type C toxin causing death in piglets in Hungary, **47**; type differentiation, **377**; enterotoxaemia in sheep, **1377**; anomalous Type B strains from Iran, **1378**; toxin causing hyperglycaemia in dogs, **2061**; enterotoxaemia in calves, **2431**; ovine enterotoxaemia in Germany, **2772**; enterotoxaemia in cows, **3517**; mode of action of chelates against toxin, **3887**; action of type C toxin on non-specific h.-i. of Newcastle virus, **3971**.
CLOVER. Fractions from Ladino clover which inhibit biological systems, **515**; goitrogenic effect, **1182**; coumestrol in forage crops, **1577**; subterranean clover and infertility in sheep, **3660**; pulmonary oedema from wild clover seeds, in cattle, **3699**; oestrogenic stimulation in anoestrous ewes on Ladino and bird's-foot trefoil pastures, **3786**.
See also Bloat.
CNEMIDOCOPTES. See Mange, general.
COAT. See Nutrition and Metabolism, cattle.
COBALT. Preventive role in Phalaris staggers, **239**; deficiency in lambs in Victoria, **1524**; Cu and Co deficiency in New Zealand, **2241**; incidence and control of deficiency in Connemara, **2947**; deficiency, in Austraia, **3676**; deficiency in lambs, **3677**; for ruminants in form of heavy pellets, **3678**.
See also Ascaris; Blood, corpuscles (red); picture; Joints; Mycobacteria, General.
COCCIDIOIDES. Ecology and geographical distribution, **388**; in dogs, **3897**; **3898**.
COCCIDIOSIS. See Eimeria Infection; Klossiella.
COD-LIVER OIL. In fresh and stored chick mash, **3688**.
See also Babesia Infection, general; Eggs, Hen; Trypanosoma Infection, general.
COENURUS. See Taenia.
COITUS. Intromission phobia in bulls, **287**; persistent preputial frenulum as cause of mating difficulties in boars, **3789**.
See also Behaviour of Animals; Salmonella Pullorum Infection.
COLI-AEROGENES GROUP. Nomenclature, **25**.
COLIMYCIN. See Digestive System, general; Urinary System, general.
COLOSTRUM. Nutritive value and effect of antibiotics on deprived calves, **4050**.
See also Brucella Infection, immunology; Erysipelothrix Rhusiopathiae Infection, immunology; Milk and Milk Products, composition.
COLUMN, VERTEBRAL. Pathology of the lumbosacral disk in cows, **235**; disk protrusion in dogs, **3360**; diseases of the intervertebral disks in cats, **3361**.
See also Abscesses. Heredity, in cattle.
COMMITTEES, CONFERENCES & CONGRESSES. Proceedings of 2nd Congress of the German Veterinary Medical Association, **3467**.
See also Milk and Milk Products, hygiene; Rabies, general; Reports, international; Rinderpest; Salmonella Group; Sterility, cattle.
COMMONWEALTH SCIENTIFIC & INDUSTRIAL RESEARCH ORGANIZATION (C.S.I.R.O.) See Reports, Australia.
CONDITIONED REFLEXES. In sheep, **2324**.
CONGENITAL TREMOR. See Trembling of Piglets.
CONGO, BELGIAN. See Cysticercus; Rinderpest; Speleognathus; Reports; Taenia; Trypanosoma Infection, cattle.
CONJUNCTIVA. See Salmonella Infection general.
CONJUNCTIVITIS, BOVINE INFECTIOUS. See Keratoconjunctivitis, Bovine Infectious.
CONJUNCTIVITIS, GENERAL. See Eyes, diseases.
COOPERIA. Resistance of cattle to C. punctata, **4026**.
COPPER. Treatment of deficiency in cattle and sheep by i/m inj. of copper aminoacetate, **522**; deficiency in cattle in East Anglia, **850**; effect of inorganic sulphate and molybdenum on metabolism in sheep, **851**; metabolism and foetal liver storage in sheep and cattle, **852**; deficiency in Canadian cattle, **1172**; deficiency in farm animals, **1173**; pathology and biochemistry of deficiency, **1174**; N-terminal amino acid residues in wool of normal and Cu-deficient sheep, **1525**; effect of dietary Cu and Mo on poults, **1532**; soil and herbage factors associated with excess Mo and hypocuprosis in Irish cattle, **1861**; Cu and Co deficiency in New Zealand, **2241**; requirements of calves, **2955**; supplements for fattening pigs, **2956**; tissue relationships and level in cattle, **3329**; copper-molybdenum-sulphate-manganese relationship in cattle, **3330**; content of hair in cattle, **3331**.
See also Blood, composition; Genital System, ovaries, ova and ovulation; Growth, growth factors; Joints; Neurospora; Nutrition, poultry; Poisoning, inorganic; Radiations.
COPPER METHYLARSENATE. See Anthelmintics, for sheep.

COPPER SULPHATE. See Growth, growth factors; Nutrition and Metabolism, poultry; swine.
CORPUS LUTEUM. See Genital System.
"CORRIDOR DISEASE". See Gonderia Infection.
CORTICOSTEROIDS, GENERAL. See Adrenal Gland, cortical hormones.
CORTISONE. Reversal by diethyl stilboestrol of depressant effect of cortisone on phagocytic activity, 1230; preparation of conjugates of bovine serum albumin with testosterone and cortisone, 1464; interrelationship between cortisone and parathyroid extract, 3422.
See also Anaplasma Infection; Candida Albicans Infection; Rickettsia Infection, general; Sterility, general; Trichinella; Trypanosoma Brucei.
CORYNEBACTERIUM INFECTION. C. diphtheriae from throat of dogs, 15; pathogenicity of C. pseudotuberculosis for mice, 341; penicillin treatment in cattle, 668; production of proteolytic enzymes by C. pyogenes, 980; C. murium from lab. mice, 1673; oxytetracycline treatment of C. ovis infection (ulcerative lymphangitis) in horses, 2402; clinical importance and differential diagnosis, 2403; vaccination of sheep against caseous lymphadenitis, 3102; spontaneous septicaemia in g.pigs, 3486.
CORYZA, AVIAN. See Haemophilus Infection.
COTTON RATS. See Litomosoides.
COTTONSEED MEAL & OIL. See Eggs, Hen; Poisoning, plants.
COTYLEDONS. See Genital System, placenta.
COUMESTROL. See Sex Hormones, oestrogens.
COW POX. See Pox Diseases.
COXIELLA BURNETI. See Rickettsia Infection, Q fever.
COXSACKIE VIRUS. See Pneumonia, Porcine Virus.
CREATININE. See Fatigue.
CROTALARIA. See Poisoning, plants.
CROWS. See Babesia Infection, general.
CRYPTOCOCCUS. C. neoformans infection in a horse, 390; mycotic mastitis, 717; 2078; 2792; 3530; occurrence in soil, 2443; C. neoformans from horse intestine, 3170; exp. murine infection, 3171.
CRYPTORCHIDISM. See Genital System, testicles.
CUCKOOS. See Books, parasitology.
CULEX. See Encephalomyelitis, Equine.
CYANACETHYDRAZIDE. See Anthelmintics, for cattle; for sheep and goats.
CYCLOSERINE. See Mycobacterium Tuberculosis Infection, treatment; Nocardia; Streptococci, General.
CYPRUS. See Reports.
CYSTICERCUS. A herd problem and significance in public health, 800; meat inspection, 801; problems in frozen meat plants in Abyssinia and Eritrea, 1104; precipitation reaction for diagnosis, 2206; in man and animals, 2909; of the brain in man and animals, 2910; control in the Belgian Congo, 3278.
See also Taenia.
CYSTOCAULUS. C. nigrescens, a synonym for C. ocreatus, 814; C. ocreatus in sheep, 2208.
CYTAUXZOON. Theileria, Gonderia and Cytauxzoon infection, 3935.
CYTOLEICHUS. C. nudus as cause of respiratory acariasis in a pheasant, 2903.
CZECHOSLOVAKIA. See Aujeszky's Disease; Babesia Infection, cattle; Bacillus Anthracis Infection; Brucella Infection, general; sheep and goats; Encephalitis, General; Epidemic Cough; Fasciola; Leptospira Infection, general; Lungworms; Newcastle Disease; Reports; Viruses, General.

D

DAIRY SCIENCE & INDUSTRY. See Milk and Milk Products.
DAMALINIA. Control in sheep by systemic administration of aldrin, 1086; control, in sheep, 3610; 3611.
DASYTRICHA. See Digestive System, ruminant digestion.
DAVAINEA. Intermediate hosts of D. proglottina, 3627.
D.D.T. See Parasiticides, chlorinated hydrocarbons.
DEER. See Anaplasma Infection; Anthelmintics, general; Brucella Infection, general; Leptospira Infection, general; Sarcosporidiosis.
DEGENERATION, MUSCULAR. See Muscles.
DEMODEX. See Mange, dogs.
DENMARK. See Brucella Infection, cattle; Leucosis, cattle; Mastitis, Bovine, general; Salmonella Infection, cattle.
DENTITION. See Teeth.
DEOXYRIBONUCLEIC ACID. See Heredity, poultry.
DERMACENTOR. See Ticks, Ixodidae.
DERMANYSSUS. Malathion for control of fowl mites, 3277.
DERMATITIS, GENERAL. See Skin, diseases.
DERMATITIS, OVINE CONTAGIOUS PUSTULAR. Exp. infection in rabbits, 424; "scabby mouth" in man, 425; size of virus, 762; pathology, 1058.
DERMATITIS, OVINE MYCOTIC. See Dermatophilus Infection.
DERMATOBIA. See Oestridae.
DERMATOPHILUS INFECTION. Species of Dermatophilus as causal agents of bovine streptothricosis, ovine mycotic dermatitis, and ovine strawberry foot rot, 2445; ecological study of mycotic dermatitis organism, 719; cutaneous streptothricosis of cattle in Nigeria, 2796; skin diseases in cattle in Kenya and their effect on leather, 4067.
DERMATOPHYTES. See Fungi, General; Microsporum Infection; Ringworm; Skin, diseases; Trichophyton.
DESERT WOOD RAT (NEOTOMA LEPIDA). See Brucella Group.
DESOXYCORTICOSTERONE ACETATE (DCA). Effect of overdosage on adrenalectomized sheep, 1229.
DETERGENTS. Arsenic content, 4086.
See also Growth, general.
DIABETES. Metabolism of lower fatty acids in diabetic sheep, 1180; alloxan diabetes in piglets, 1181; responses of fowls to hyper- and hypoglycaemic agents, 1877; clinical study and pathology of diabetes mellitus in dogs, 2968; oral antidiabetic drugs, 3346; biochemistry in dogs, 3691; activation of quiescent mucormycotic granuloma in rabbits by alloxan diabetes, 3896.
DIALKYL DITHIOCARBAMATES. See Eimeria Infection, treatment.
DIAMINES. See Mycobacterium Tuberculosis Infection, general; Trypanosoma Infection, treatment.
2-6 DIAMINOPURINE. See Embryos, Mammalian, and Foetuses.
DIAPHRAGM. A bone, in camels, 917 and 918; function of the tendinous centre in dog and cat, 4123.
DIARRHOEA, BOVINE VIRUS. Winter dysentery in dairy cattle, 421; propagation in tissue culture, 1780; simultaneous immunization of cattle against leptospirosis, virus diarrhoea and rhinotracheitis, 2851.
DIARRHOEA, CALF. Use of electrolytes in treatment of calf scours, acidosis and potassium deficiency, 547.
See also Escherichia Coli; Salmonella Infection, cattle.
DIARRHOEA, GENERAL. Epidemic, of infant mice, 1074; effect of oral chlortetracycline on diarrhoea and weight of intestines, in rats, 2238.
See also Balantidium; Ostertagia.
DIARRHOEA, PORCINE VIRUS. Similar disease in Gt. Britain, 2161; 3240; in Italy, 2858.
DIATHESIS, EXUDATIVE. Prevention in chicks by selenium and "factor 3", 536-537; 2751.
See also Vitamins, vitamin E.
DIAZINON. See Parasiticides, phosphorus compounds; toxicity.
DICROCOELIUM. Gall Bladder puncture and fistulas for diagnosis in cattle, 1480; migration of metacercariae of D. dendriticum, 2202.
DICTYOCAULUS. Transmission of D. viviparus in cattle and pasture conditions, 166; D. arnfieldi in ponies and a donkey, 486; overwintering of D. viviparus larvae on pasture, 487; control of D. viviparus in cattle, 812; factors affecting infestation of sheep with D. filaria, 813; serum protein changes, antibody formation and eosinophilia in infested cattle, 1125; pathology in calves, 2917.
See also Anthelmintics, for cattle; for sheep and goats.
DIELDRIN. See Parasiticides, chlorinated hydrocarbons.
DIETHYLAMINE ACETARSOL. See Poisoning, therapeutics.
DIETHYLCARBAMAZINE. See Anthelmintics, for cattle; for sheep and goats.
DIETHYLSTILBOESTROL. See Sex Hormones, oestrogens.
DIGESTIVE SYSTEM.
General. Cautions regarding use of anthraquinone violet in digestion and absorption studies, 505; intestinal permeability to proteins in new-born herbivores, 1518; emesis in dogs and pigeons, 1583; pressure-sensitive telemetering capsule for study of gastro-intestinal motility, 1641; digestive enzymes in baby pigs, 2312; 2313; abdominal topography in pigs; 2329; colimycin for disease of gastro-intestinal and urinary systems in dogs, 2787; absence of lesions in rats after ingestion of silica, 2936; microflora of pendulous crop in turkeys, 3176; serum transaminase in hepatic and gastro-intestinal diseases, 3372; trans-unsaturated acids in faecal lipids, 3423; presence of alkaline phosphatase, 3741; effect of antibiotics on intestinal putrefaction, 4051; histochemistry of avian stomach and intestine, 4116.
See also Antibiotics, General; Balantidium; Blastomyces Infection; Bloat; Clostridium Botulinum Intoxication; Foreign Body Syndrome, Cattle; Nutrition and Metabolism, in relation to disease; Ostertagia; Radiations; Technique and Apparatus, miscellaneous.
Fauna & flora. Differences in healthy, infected and penicillin-fed chicks, 2239; intestinal flora in horses with certain skin lesions, 3112.
See also Digestive System, general; ruminant digestion; Manganese.
Intestines. Enzymes in the ileal juice of horses, 2311; physiology of large intestine in cattle in tropics, 2321; pigmentation of intestinal muscles in steatorrhoea,

DIGESTIVE SYSTEM—Intestines—[cont'd.]
2564; ileal intussusception in sheep, 3357; biosynthesis of intestinal mucins, 3750.
See also Antibiotics, General; Diarrhoea, General; Euthanasia; Heredity, in cattle; Megacolon; Oedema Disease of Pigs; Teratology.
Oesophagus. Topography and function, with regard to obstruction, 2978; oesophageal innervation and eructation in sheep, 3749.
See also Neoplasms, in dogs.
Ruminant digestion. Book, alimentary tract of ruminants, 1295; physiology, 1933; absorption from the rumen, 601; the act of rumination, 2320; anatomical studies of the goat's stomach, 603; development of ruminant stomach, 188; nitrogen metabolism, 1852; oesophageal fistula in sheep, 2937; regurgitation mechanism, 600; 4115; reticular pressure, 2563; secretory activity of duodenum, pancreas and caecum in sheep, 1936; studies in sheep, 2232; utilization of end products, 2555; water content in gastrointestinal tract of cattle, 1237; reflex contraction of reticulum and rumen, 1598; 2647; reflex closure of oesophageal grove in calves, 1155; nervous control of rumination, 1600; nervous structure in reticulo-ruminal epithelium of goats, 1606; bovine digestion and indigestion, 4045; effect of spring grass on rumen digestion and metabolism in cows, 1832; fungi in abomasal ulcers in calves, 1022; effect of ingestion of paraffin on ruminants, 1159-1161; factors affecting surface tension and pH of rumen fluid, 511; 512; effect of volatile fatty acids, lactic acid and ammonia on rumen pH in sheep, 1162-1163; metabolism of lower fatty acids in diabetic sheep, 1180; rumen volatile acids in normal, fasting, and ketotic cows, 544; volatile fatty acid production in an artificial rumen, 2569; absorption of chloride ions from reticulum and rumen, 1531; hydrolysis of xylan and xylo-oligosaccharides by ruminal enzymes, 1587; redox potential in rumen contents, 1843; 3311; effect of blood sugar changes on rumen motility in sheep, 1930; rumen flora, digestive enzymes and indigestion, 2607; rumen function and plasma spermine oxidase, 3410; acetate utilization in sheep, 3694; normal flora in bovine rumen, 2088; normal faecal flora in cattle, 2089; facultative bovine ruminal flora and putrefaction, 2799; microbial metabolism, 1157; effect of roughage on rumen bacteria, 845; counting ruminal ciliates, 745; does ruminal flora produce antibiotics?, 725; amino acid composition of ovine rumen microbial preparations, 521; conversion of casein into microbial proteins, 1164; utilization of carbohydrate metabolites by rumen micro-organisms, 1846; effect of oral oxytetracycline on rumen bacteria in sheep, 3541; enzymic degradation of starch by holotrichs from ovine rumen, 3559; cellulose hydrolysis by rumen micro-organisms, 64; methanogenic rumen bacteria, 397; relationship between certain rumen bacteria and ciliate Dasytricha ruminantium, 2114; growth of rumen organisms in vitro, 2115; cellulose-digesting rumen bacteria, 2453; proteolytic system of a Gram-negative rod from bovine rumen, 2454; a filamentous bacterial rumen organism, 2798.
See also Bloat; Digestive System, oesophagus; Foreign Body Syndrome, Cattle; Nervous System, general; Parasiticides, phosphorus compounds; Phosphates; Radiations; Salivary Glands; Saponins; Sodium Chloride; Trace Elements; Trichostrongylus; Vitamins.
DIHYDROXYANTHRAQUINONE. See Anthelmintics, for cattle.
DIMETHYL QUINOXALINE DIOXIDE. See Pneumonitis, Feline.
DIMETHYL TRICHLORETHYL PHOSPHONATE ("L 13/59"). See Anthelmintics, for sheep and goats; Parasiticides, general.
DIMETHYL TRICHLOROXYETHYL PHOSPHONATE ("CHLOROPHOS"). See Oestridae, Hypoderma.
DIMETHYL TRICHLOROHYDROXYMETHYL PHOSPHONATE ("NEGUVON"). See Anthelmintics, for cattle.
DIMIDIUM BROMIDE. See Trypanosoma Infection, treatment.
DINITROCARBANILIDE. See Eimeria Infection, treatment.
DINITRO CRESOL. Metabolism in ruminants, 3721.
DIPHENYL-PARA-PHENYLENE DIAMINE (DPPD). See Growth, growth factors; Iron.
DIPHYLLOBOTHRIUM ERINACEI. See Sparganum.
DIPHYLLOBOTHRIUM LATUM. Experimental vectors of first larval stages, 805.
DIPS & DIPPING. See Parasiticides; Ticks, Ixodidae.
DIROFILARIA. In dogs in the Far East, 493; heartworms in dogs in Victoria, 1130; as cause of pulmonary vascular sclerosis in dogs, 1131; chemotherapy in dogs, 1132; 1820.
DISINFECTANTS, ANTISEPTICS & STERILIZATION. Action on bacteria in droplets and in large volumes, 715; sterilizing action of fast electrons on microorganisms, 1728; viricidal disinfectants and haemagglutination, 2510; evaluation of disinfectants in chick embryos, 2511; influence of initial vacuum on sterilization of dressing, 2701; disinfection of railway cattle trucks, 3795; infected cork closures and apparent survival of organisms in antiseptics, 4104.
See also Cetrimide; Formaldehyde; Hexyl Resorcinol; Eimeria Infection, treatment and control; Mycobacterium Tuberculosis Infection, general; Newcastle Disease, virus; Poisoning, therapeutics; Technique and Apparatus, bacteriological.
DISKS, INTERVERTEBRAL. See Column, Vertebral.
DISTEMPER, DOG. Complex, 1067; encephalitis, 768; 1070; aetiology of hard pad disease, 130; differential diagnosis from toxoplasmosis by electrophoresis, 224; aetiological relationship with measles, 444; complicating horsesickness in foxhounds, 1055; viraemia and antibodies, 1068-1069; cross immunity between distemper and rinderpest, 1454; atomized vaccine, 129; avirulent virus vaccine, 2162; multiplication of egg-adapted virus in vaccinated host, 769; response to vaccination, 481; titration, in chick embryos, 3968.
DISTILLERS' SOLUBLES. See Growth, growth factors.
DISTOMUM. See Fasciola.
DITHIAZANINE. See Anthelmintics, general.
DITHIOCARBAMATES. See Anthelmintics, for poultry; for sheep and goats.
"DITRAZIN" [DIETHYLCARBAMAZINE CITRATE]. See Anthelmintics, for sheep and goats.
DOGS.
General. See Anaesthesia and Analgesia; Blood; Bones, general; Diaphragm; Digestive System, general; Euthanasia; Genital System, prostate gland; Nervous System, brain; cerebrospinal fluid; Nutrition and Metabolism, general; carnivora; Parathyroid Glands; Proteins; Semen and Spermatozoa, evaluation; Skin, general; Thyroid Gland; Urinary System, general; Zootechny.
Arthropod parasites. See Fleas; Linguatula; Mange.
Bacterial & fungous diseases. See Bacillus Anthracis Infection; Blastomyces Infection; Brucella Melitensis Infection; Clostridium Tetani Infection; Coccidioides; Corynebacterium Infection; Leptospira Infection; Pleuropneumonia Group; Mycobacterium Tuberculosis Infection, diagnosis; treatment; tuberculin test; Streptococcus Infection; Trichophyton.
Diseases, general. See Ataxia; Bones, diseases; Chorea; Circulatory System, heart; Column, Vertebral; Diabetes; Digestive System, general; Dysplasia, Hip; Epilepsy; Eyes, diseases; Genital System, prostate gland; uterus; Heredity; Leucosis; Myositis, Eosinophilic; Neoplasms; Skin, diseases; Spleen; Surgery; Thyroid Gland; Urinary System, general; bladder; Vitamins, vitamin C.
Helminth parasites. In Sarajevo, 833.
See also Anthelmintics; Dirofilaria; Echinococcus; Helminth Parasites, General; Schistosoma; Spirocerca; Toxocara.
Protozoan diseases. See Leishmania Infection; Toxoplasma Infection, dogs.
Virus & rickettsial diseases. An infectious, febrile, haemorrhagic disease, 1433.
See also Aujeszky's Disease; Distemper, Dog; Hepatitis, Canine Virus; Horsesickness, African; Psittacosis-Lymphogranuloma Group; Rabies; Rhino-Tonsillitis, Canine Contagious; Rickettsia Infection.
DONKEYS. See Horses, Donkeys and Mules.
"DOUBLE SCAUP". See Bones, diseases.
DOURINE. See Trypanosoma Equiperdum Infection.
DOW ET-57 ("TROLENE"). See Anthelmintics, for cattle; Oestridae, Hypoderma; Oestrus; Parasiticides, phosphorus compounds; toxicity.
"DRY COAT". See Sweating and Sweat Glands.
DUCKS. See Acuaria; Blood, composition; Eimeria Infection, avian; Erysipelothrix Rhusiopathiae Infection, avian; Growth, growth factors; Hepatitis, Duck Virus; Heredity, poultry; Hymenolepis; Insemination, Artificial, poultry; Leptospira Infection, avian; Leucocytozoon Infection; Liver, diseases; Parasiticides, toxicity; Pasteurella Infection, avian; Physocephalus; Plasmodium Infection; Polymorphus; Psittacosis; Salmonella Infection, avian; Vitamins, vitamin A.
DWARFISM. See Bones, general; diseases; Heredity, cattle; Temperature, environmental.
DYSENTERY, PORCINE VIBRIONIC. See Vibrio Suis Infection.
DYSPLASIA, HIP. Heredity, in dogs, 950; heredity of "splayleg" in rabbits.
DYSPNOEA. See Respiratory System, diseases.
DYSTOKIA. See Parturition.
DYSTROPHY, MUSCULAR. See Muscles.

E

EARTHWORMS. Eisenia lonnbergi, intermediate host of pig lungworms, 818.
EAST COAST FEVER. See Theileria Infection.
ECHINOCOCCUS. In the heart of cattle, 160; exp. infection of sheep, 161; pulmonary, in a monkey, 478; in rumi-

ECHINOCOCCUS—[cont'd.]
nants and pigs in Greece, 802; in man in South Africa, 1105; in dogs in Australia, 1811; fox as host, 1812; route of introduction in a Japanese island, 2536; in man in Kenya, 2911.
ECHINOPARYPHIUM. E. recurvatum in turkeys, 3623.
ECTHYMA, CONTAGIOUS. See Dermatitis, Ovine Contagious Pustular.
ECTROMELIA. See Pox Diseases, mouse pox.
ECZEMA. See Poisoning, plants; Skin, diseases.
EDUCATION, VETERINARY. Guide to veterinary bibliography and veterinary doctorate, 1979; world catalogue of veterinary teaching establishments, 1992.
EGGS, DUCK. See Vitamins, vitamin A.
EGGS, HEN. Blood and meat spots, 233; 556; effect of nicarbazin on quality and production, 895; 896; 3922; biochemistry of formation, 922; 1941; cholesterol, linoleic and linolenic acid content, as influenced by dietary fat, 1847; effect of cod-liver oil on phospholipid composition, 1848; seasonal variation in production, 1940; potassium iodide and hatchability, 2236; changes in composition affecting hatchability and chick growth, 2274; lindane taint, 2299; fish meal and hatchability, 2556; 2934; pink whites and yolks associated with cottonseed meal and oil, 2557; controlling sex by dipping eggs in hormone soln., 2680; preservation, 3430; changes in plasma calcium conc. during formation, 4112.
See also Behaviour of Animals; Eimeria Infection, treatment; Encephalitis, Murray Valley; Iron; Salmonella Infection, avian; Vitamins, D_3.
EIMERIA ADENOEIDES. See Eimeria Infection, avian.
EIMERIA ARLOINGI. See Eimeria Infection, sheep and goats.
EIMERIA BOVIS. See Eimeria Infection, cattle.
EIMERIA FAUREI. See Eimeria Infection, sheep and goats.
EIMERIA INFECTION (COCCIDIOSIS).
General. In domestic animals, 3920; diagnosis and treatment in rabbits, 3545.
Avian. In ducks in Britain, 1032; in turkeys with E. adenoeides and meleagrimitis, 2457; life cycle and pathogenicity of E. adenoeides in poults, 3546; toxic substance in E. tenella oocyst, 2923; exp. E. mitis infection in chicks, 3924; species in pigeons, 3991.
See also Eimeria Infection, treatment.
Cattle. Endogenous development of E. zurnii, 73; effect of temp. on sporulation of E. zurnii, 74; resistance of calves to E. bovis, 75.
See also Eimeria Infection, treatment.
Horses. Renal infection, 1747.
Rabbits & hares. See Eimeria Infection, treatment and control.
Sheep & goats. E. arloingi and E. ninae-kohl-yakimovi in lambs, 735; infection of sheep with E. ninae-kohl-yakimovi and E. faurei, 1031; incidence, endotoxin and treatment of ovine infection, 1748.
See also Eimeria Infection, treatment and control.
Treatment & control. In sheep, 1748; drugs for poultry, 402; destruction of oocysts with chemicals, 78; in calves and chicks with chlortetracycline, 401; effect of aureomycin and sulphamethazine in chicks, 1033; low level and single dose treatment in calves, 3921; interrupted treatment and prophylaxis in E. necatrix infection, 3925; chemotherapy of hepatic and intestinal form in rabbits, 3200; effect of menaphthone on mortality from E. tenella, 1404; 2808; menaphthone therapy in fowls, 1750; inhibition of vitamin K activity by sulphaquinoxaline in chicks, 1405; effect of nicarbazin and synergism between sulphabenzpyrazine, sulphadimidine and pyrimethamine, in infected chicks, 76; dinitrocarbanilide in egg yolks from hens fed nicarbazin, 77; effect of nicarbazin on spermatogenesis and semen quality in fowls, 736; effect of nicarbazin on growth, maturity, egg production, fertility and hatchability, 895; 3922; immunity in fowls in the presence of nicarbazin, 1739; nitrofurazone for rabbits, 2807; induced resistance to nitrofurazone in E. tenella, 1407; furacin for sheep and goats, 2806; effect of furazolidone on fertility and hatchability, 1406; treatment with dialkyl dithiocarbamates, 79.
See also Eggs, Hen; Poisoning, therapeutic substances.
EIMERIA MELEAGRIMITIS. See Eimeria Infection, avian.
EIMERIA MITIS. See Eimeria Infection, avian.
EIMERIA NECATRIX. See Eimeria Infection, treatment and control.
EIMERIA NINAE-KOHL-YAKIMOVI. See Eimeria Infection, sheep and goats.
EIMERIA TENELLA. See Eimeria Infection, avian; treatment and control.
EIMERIA ZURNII. See Eimeria Infection, cattle.
EISENIA. See Earthworms.
EJACULATION. See Semen and Spermatozoa, general; collection.
ELAEOPHORA. "Summer bleeding disease", a sheepskin defect associated with E. schneideri, 634.
ELECTROCARDIOGRAPHY. See Circulatory System, heart.
ELECTRON MICROSCOPY. See Technique and Apparatus, microscopy (electron microscopy).
ELECTROPHORESIS. In diagnosis, 561; zone electrophoresis of mammalian sera in starch gels, 2277; 2278; two-dimensional, 2651.
See also Blood, composition; Eyes, general; Fasciola; Hygiene, food; Muscles; Mycobacterium Tuberculosis Infection, diagnosis; Toxoplasma Infection, dogs; Trypanosoma Infection, general.
ELEPHANTS. Diseases, 868.
See also Babesia Infection, general.
ELK. See Brucella Infection, general.
EMBRYOS, FOWL. Changes in chorioallantois wrongly attributed to virus, 640; radioisotope technique for determination of allantoic fluid volume, 641; teratogenic effect of beta-amino-propionitrile on chick embryos, 892; absence of wound healing in chick embryos, 1246; effect of yolk contamination with bacteria on embryonic and chick mortality, 1726; technique for inoculation of chorioallantoic membrane, 2371; protein precursors in vivo, 2653; incidence of parthenogenetic development, 3407.
See also Borna Disease; Brucella Group; Chick Embryo Lethal Orphan Virus; Genital System, ovaries; Pox Diseases, canary pox; fowl pox; mouse pox (ectromelia); sheep pox; Semen and Spermatozoa, general; Technique and Apparatus, viruses and rickettsia; Tissue Cultures.
EMBRYOS, MAMMALIAN, & FOETUSES. Passage of acetate via placenta and uptake by foetal sheep, 217; effect of TR, TEM and TEPA on rat litter in utero, 272; effect of 2-6 DP, CIP and ThG on rat litter in utero, 273; development of epidermis and hair canals in sheep, 591; fate of globulin injected into foetal circulation, 592; effect of mummification on prolificacy in cattle, 948; effect of irradiation with P^{32} on rat embryos, 1557; gestational variations in composition of foetal fluids and urine in sheep, 1585; haemopoiesis in yolk sac of foetal lambs, 1592; acid mucopolysaccharides in chorion, 1603; importance of Mn for development in g.p.gs, 2586; Ca, Mg and P in foetal tissues, 2589; cardiovascular response in foetal lambs to hypoxia, 2611; changes in rat placenta and foetus following infection with various bact. species, 2784; effect of ultrasonic waves on development, in rabbits, 3054; gastrula and primitive streak stage in cattle, 3740.
See also Abortion, Equine Virus; Adrenal Gland, medullary hormones; Blood, composition; haemoglobin; pressure; Bones, general; Books, embryology; Copper; Genital System, allantoic and amniotic membranes and fluids; placenta; Leptospira Infection, cattle; Mycobacterium Johnei Infection; Nervous System, brain; Poisoning, therapeutics; Temperature, environmental; Teratology; Thyroid Gland; Trypanosoma Infection, cattle; Vitamins, vitamin B (folic acid); vitamin B_{12}; Wool.
EMESIS. See Digestive System, general.
EMETINE. See Anthelmintics, for sheep and goats.
ENCEPHALITIS, EQUINE. See Encephalomyelitis, Equine.
ENCEPHALITIS, GENERAL. North American encephalitis viruses isolated from Culex tarsalis, 416; tick-borne encephalitis virus in goats' milk in Slovakia, 1051; antibodies of tick-borne encephalitis in bats, 1423; exp. transmission to goats of Czechoslovak tick-borne encephalitis by I. ricinus, 3578; selection of Czechoslovak virus strains for vaccine production, 3579; isolation of tick-borne encephalitis virus from field mice Clethrionomys glareolus in Slovakia, 3949; pathogenicity of tick-borne encephalitis virus for hamsters and foxes, 3950; neurotropic virus infections in Slovakia, 3580; due to pseudo-anthrax organism, in piglets, 1665.
See also Distemper, Dog; Encephalomyelitis; Pasteurella Infection, cattle; Rabies, general; Pleuro-Pneumonia Group.
ENCEPHALITIS, JAPANESE B. In man and domestic animals in Vietnam, 96-97; antigenically related virus from bats, 2132; pigs as potential reservoir, 3581; tissue culture, 3582.
ENCEPHALITIS, MURRAY VALLEY. Antibodies in hens' eggs, 1052; survey of human and animal sera in Queensland, 1422.
ENCEPHALITIS, SPRING-SUMMER. Isohaemolysis by the virus of an encephalitis resembling spring-summer encephalitis, 2472.
ENCEPHALITIS, ST. LOUIS. North American encephalitis viruses isolated from Culex tarsalis, 416.
ENCEPHALOMALACIA, AVIAN. Genetic differences in resistance of fowls, 210; tocopherol status in normal and affected fowls, 857; nutritional, in a warm climate, 3343.
ENCEPHALOMALACIA, GENERAL. Caused by mouldy maize in equines in China, 2790.
ENCEPHALOMYELITIS, AVIAN (EPIDEMIC TREMOR). Lens opacity associated with epidemic tremor, 1446; 2990; in France, 2875; pathology, 2876; egg adaptation of virus and embryo susceptibility, 2877; 2878.
ENCEPHALOMYELITIS, EQUINE. Near-Eastern type, FAO/OIE meeting on control of tick-borne diseases in

ENCEPHALOMYELITIS, EQUINE—[cont'd.]
livestock, 98; wild birds as hosts, 99; 100; liver lesions in lab. animals, 101; encephalitis viruses isolated from Culex tarsalis, 416; natural infection in turkeys, 417; Western type antibodies in exp. infected pigeons, 418; reciprocal immunity and Eastern and Western type infection in horses and sparrows, 1421; paper disk technique for collection of blood and serum samples for virus study, 1775; in pheasants, and role of mosquitoes, 2134-2138; mosquitoes and winter survival of virus, 2474; 2475; infectious ribonucleic acid component of Eastern type virus, 2476; haemagglutinins of Eastern type virus in chick embryo tissue culture, 2839; chronic latent Western type infection in birds, 2840; studies on Western virus in tissue culture, 3222; 3582; immunological overlap between Sindbis and Western equine encephalomyelitis viruses, 3223; survival of Western type in I. ricinus, 3583; study in pheasants, 3951; neutralizing antibodies of Eastern and Western type in serum of domestic animals in Slovakia, 3952; isolation and identification of Western type from mosquitoes by tissue culture, 3953.
See also Borna Disease.

ENCEPHALOMYELITIS, GENERAL. Sporadic, bovine, 2142.
See also Immunology, allergy and anaphylaxis; Rabies, general.

ENCEPHALOMYELITIS, MURINE. Survival of virus in living invertebrates, 3246.

ENCEPHALOMYELITIS, OVINE (LOUPING ILL). Tick-borne meningoencephalomyelitis (louping ill) in Sweden, 2146.

ENCEPHALOMYELITIS, PORCINE (TESCHEN DISEASE). Geographical and seasonal incidence, 124; virus, epidemiology and control, 125; influence of diet on susceptibility, 428; skeletal and cardiac muscle lesions, 429; diagnostic value of non-purulent encephalomyelitis in swine fever, 765; effect of ultrasonic waves on virus, 766; tissue culture neutralization test, 1064; tissue culture, 1065; 2156; 2157; 2158; and Talfan disease, 2159; biology of virus, 2487; experimental pathology, 2488; sedimentation constant of virus, 2489; diseases of the c.n.s. in pigs, 2982; preparation of immune serum in rabbits, 3238; immunization in Madagascar, 3591; formolized tissue culture vaccine, 3592.
See also Talfan Disease.

ENDOCRINE SYSTEM. Influence of endocrine glands on fatty acid and ketone body metabolism, 2969.
See also Adrenal Gland; Anaemia, General; Pineal Body; Pituitary Gland; Sex Hormones; Sterility, cattle and buffaloes; Thyroid Gland; Vitamins, general.

ENDOMETRITIS. See Genital System, uterus.

ENDRIN. See Parasiticides, chlorinated hydrocarbons.

ENTERITIS, CALF. See Escherichia Coli; Pneumo-Enteritis.

ENTERITIS, FELINE. Clinical and histopathological aspects, 770; virus diseases of young cats, 1434; cultivation of panleukopenia virus in tissue culture, 1435.

ENTERITIS, GENERAL. Enteritis-dermatitis in piglets, 2235; haemorrhagic, in turkeys, 2612.
See also Nutrition and Metabolism, in relation to disease.

ENTERITIS, PORCINE. Haemorrhagic, in pigs, 227; aetiological relationship between certain types of gastro-enteritis and pneumonia, 1195.
See also Diarrhoea, Porcine Virus.

ENTEROBACTERIACEAE, GENERAL. See Salmonella Group.

ENTEROHEPATITIS. See Histomonas Meleagridis Infection.

ENTEROTOXAEMIA. See Clostridium Welchii Infection.

ENZYMES, GENERAL. Use in vet. medicine, 572; parenteral enzyme therapy with streptokinase-human plasminogen-streptodornase, 3010.
See also Blood, composition; Digestive System, general; intestines; ruminant digestion; Genital System, testicles; Helminth Parasites, General; Immunology, general; Liver, bile; Mastitis, Bovine, treatment; Neurospora; Phosphates; Rabies, immunology; Salivary Glands; Trypsin; White Muscle Disease.

EOMENACANTHUS. Control of E. stramineus in turkeys, 3267.

EPERYTHROZOON. Toxicity of some bact. filtrates for mice infected with E. coccoides, 63; antibiotic treatment in pigs, 398; c.f. test in pigs, 1028.

EPIDEMIC COUGH. In a stud in Slovakia, 1053.

EPIDEMIC TREMOR. See Encephalomyelitis, Avian.

EPIDIDYMIS. See Brucella Infection, sheep and goats; swine; Escherichia Coli Infection, goats; Genital System; Vaginitis, Bovine.

EPILEPSY. Primidone treatment in dogs, 1225; clinical and anatomical study in dogs, 2986; familial epileptiform disease in rabbits, 3058.

EPINEPHRINE. See Adrenal Gland, medullary hormones.

EPITHELIOGENESIS IMPERFECTA. See Teratology.

EPIZOOTIC LYMPHANGITIS. See Histoplasma Farciminosum Infection.

E.P.N. See Parasiticides, phosphorus compounds.

ERGOT. See Poisoning, plants.

ERITREA. See Cysticercus.

ERYSIPELOTHRIX (LISTERIA) MONOCYTOGENES INFECTION. Symposium, 2022; in animals, 3841; pathology, 3845; pathogenesis, 2405; 3842; serological diagnosis, 3840; abortion in cattle, 1329; 3105; in cattle in Azerbaijan, 1677; and malignant catarrh in cattle, 1880; in sheep and goats, 670; 981; septicaemia in new-born lambs, 2020; in pigs, 1678; 1679; 2021; 3843; 3844; isolation from pigs with swine fever, 2738; exp. air-borne infection, 1330; exp., in pregnant animals, 3106; exp., in rabbits, 2739; lemmings as exp. animals, 983; immunization in mice, 1331; effect of pasteurization on content in milk, 2023; rapid detection of colonies and colonial dissociation, 342-343; morphology and culture, 3846; cell wall, 3847; serology of strains, 982; serology of type IV strains, 3107; triphenyltetrazolium chloride for differentiation of E. rhusiopathiae and E. monocytogenes, 3493; sensitivity to nitrofurans, 344.

ERYSIPELOTHRIX RHUSIOPATHIAE INFECTION [SWINE ERYSIPELAS].
General. Effect of stomach contents and soil on viability of E. rhusiopathiae, 3103; cultural and biochemical study, 3488; triphenyltetrazolium chloride for differentiation of E. rhusiopathiae and E. monocytogenes, 3493; serum protein and glycoprotein changes in swine with exp. arthritis, 3838; rheumatoid-like arthritis in pigs, 3839.
Avian. In ducks and pheasants, 19; outbreak in fowls, 3490.
Immunology. Transfer via colostrum from dam to piglets, 17; Traub's vaccine, 669; hyperimmunization of horses, 1326; preparation of pig serum, 1327; antibiotics and immunity, 1328; arthritis in pigs after vaccination, 1675; "negative" phase in serum horses, 1676; semi-synthetic medium for production of antigen and avirulent culture, 2017; vaccination, 2018; vaccine evaluation by skin scarification, 2019; Swedish avirulent AV/R9 vaccine, 2737; modified vaccine, 3489; immunochemistry of antigenic structure, 3491; Middlebrook-Dubos test, 3492.
Sheep. In Serbia, 1674.
Treatment. With hyaluronidase, 18; antibiotics and immunity, 1328; penicillin resistance, 3104.

ERYTHROMYCIN. International standard, 2303.
See also Streptococci, General.

ESCHERICHIA COLI INFECTION.
General. Study of 111 strains, 682; infantile enteritis strains in meat, 1334; typing method, 354; nuclear division in E. coli, 353; K antigen 61 (B7) in Group O, 2030; aetiological role of the Escherichia Group, sensitivity to antibiotics, 2028; effect of X-rays on susceptibility to toxin, 23; effect of endotoxin on kidney weight, 352; relationship between vascular manifestations and endotoxin shock, 683-684; additive action of chloramphenicol and tetracyclines on growth, 2408; rabbit mortality and age of culture, 2744; antibacterial substances in infected uteri of rabbits, 3114; exp. pyelonephritis, 3854; role of serine in metabolism, 3855.
See also Coli-Aerogenes Group.
Avian. Of the eye in fowls, 351; pathology in fowls and turkeys, 1337; incidence in West Pakistan, 1685; mortality in Hjärre's disease, 3497.
Cattle. Isolation of two antigenic types from calves, 349; as cause of mastitis, 680; 681.
Dogs. Antigenic structure of strain from dog, 3496.
Goats. Exp. production of "seminal retention" epididymitis, 1335; seminal congestion in goats, associated with E. coli, 2029.
Sheep. In lambs, 985; 3113.
Swine. Presence of haemolytic E. coli in oedema disease, 350; gastro-enteritis in piglets, 1336; serotypes associated with oedema disease in pigs, 2742; 3359; use of immune serum in agalactia, associated with postparturient fever syndrome in sows, 2743.
See also Oedema Disease of Pigs.

ETHIDIUM BROMIDE. See Trypanosoma Infection, treatment.

ETHOPROPAZINE ("PARSIDOL"). See Chorea.

EUTHANASIA. Electrical, in dogs, 635; changes in intestinal mucosa of sheep, following use of humane killer, 2693; destruction of large numbers of turkeys, 3794.

EXANTHEMA, COITAL. Tissue culture of virus, 3590.

EXANTHEMA, GENERAL. See Skin, diseases.

EXANTHEMA, VESICULAR. New immunologically distinct types of virus, 126; inj. into tongue of fowls for differentiation from vesicular stomatitis, 430; growth in pig kidney tissue culture, 3239.
See also Vesicular Diseases, General.

EYES.
General. Osmotic pressure of aqueous humour, 1586; electrophoresis and freeze-drying of aqueous humour, 3739.
See also Anaesthesia and Analgesia, in cattle; Technique and Apparatus, photography.
Diseases. Veterinary ophthalmology, 2710; 3716; granulomatous chorioretinitis in turkeys, 557; lesions in fowls caused by ammonia fumes, 886; 1201; enlargement in fowls exposed to continuous light, 1231; cataract of

EYES—Diseases—[cont'd.]
unknown aetiology in fowls, **1552**; **4072**; conjunctivitis in chicks, **1790**; protein deficiency and congenital eye abnormalities in rats, **1850**; adherence of pupillary membrane to cornea in dogs, **2691**; amaurosis in sheep, **3358**.
See also Candida Albicans Infection; Encephalomyelitis, Avian; Escherichia Coli Infection, avian; Haemophilus Infection; Neoplasms, in cattle; Newcastle Disease, virus; Psittacosis-Lymphogranuloma Group; Rickettsia Infection, cattle; Spirillum; Vitamins, vitamin A.

F

FABRICIUS, BURSA OF. Significance in antibody production, **782**; **3262**; **3263**; histochemistry, **3761**.
FAECES. See Cattle, virus and rickettsial diseases; Digestive System, general; ruminant digestion; Nematodes, General; Pregnancy, diagnosis; Salmonella Infection, in poultry; Sex Hormones, oestrogens; Technique and Apparatus, parasitological; Trichomonas Infection, avian; Trypsin.
FALLOPIAN TUBES. See Genital System, ovaries, ova and ovulation.
FARCY, BOVINE. See Nocardia.
FARM BUILDINGS. See Hygiene, livestock.
FASCIOLA. Meteorological factors in epidemiology, **158**; chemotherapy, **159**; antagonistic action of sheep serum on miracidia, **479**; treatment in pigs, cattle, horses and sheep by s/c inj. of CCl_4, **796**; **1099**; **1478**; **2203**; electrophoresis of serum, peritoneal and pericardial fluid in infested sheep, **1100-1101**; in man, **1102**; gall bladder puncture and fistulas for diagnosis in cattle, **1480**; incidence in sheep and cattle in Slovakia, **1494**; CCl_4 applied intraruminally in cattle, **1807**; mouse test for infectivity of metacercariae in snail faeces, **2532**; development of metacercariae of F. gigantica, **2533**; epidemiology and control, **2905**; in Bulgaria, **2906**; flotation method for demonstration of eggs in faeces, **2907**.
See also Mycobacterium Tuberculosis Infection, tuberculin test; Salmonella Infection, sheep and goats.
FAT. See Eggs, Hen; Milk and Milk Products, composition; Swine, general; "Yellow Fat Disease".
FATIGUE. Effect on blood composition in cattle, **1924-1927**.
FATTY ACIDS. See Blood, composition; Diabetes; Digestive System, ruminant digestion; Eggs, Hen; Endocrine System; Fertility, general; Milk and Milk Products, composition.
FAVUS. See Microsporum Infection.
FEATHER-GRASS (STIPA PENNATA). See Grasses.
FEATHERS. See Amino Acids; Growth, growth factors; Moulting.
FERRETS. See Genital System, oestrous cycle.
FERRITIN. See Liver.
FERTILITY.
General. Effect of dietary erucic and other fatty acids in rats, **1849**; X-irradiation and female mammalian fertility, **4151**.
See also Books, reproduction; Sterility; Zinc.
Cattle & buffaloes. Endocrine activity, body temp., genital secretions and fertility/sterility in buffaloes, **946**; assessment in bulls, **1617**; effect of expression of corpus luteum, **1962**; breeding-rest fertility programme, **2354**.
See also Insemination, Artificial, cattle; Vibrio Fetus Infection, cattle.
Fowls. Access to grass and breeding in fowls, **840**; effect of furazolidone on fowls, **1406**.
See also Semen and Spermatozoa, diluents and additives; Vitamins, vitamin A; vitamin E.
Horses. See Semen and Spermatozoa, general; Vitamins, vitamin E.
Sheep. Hormonal augmentation, **1268-1269**; hormones and sheep fertility, breeding out of season, **1626**.
Swine. After caesarian section, **1954**.
FERTILIZATION. Review of literature, **290**.
See also Genital System, oestrous cycle; ovaries, ova and ovulation; Sex Hormones, progesterone.
FEVER. Role of endogenous pyrogens, **4063**.
FEVER, BOVINE EPIZOOTIC. Immunological study in Japan, **115**.
FIBROMA, SHOPE'S. Passage through mice, one day old, **2868**.
See also Myxomatosis.
FIBROSARCOMA. See Neoplasms, in sheep.
FINLAND. See Rabies, immunology.
FISH MEAL. See Eggs, Hen; Salmonella Infection, general.
FLAVOFUNGIN. A new crystalline antibiotic, **2794**.
FLEAS. Control in dog kennels, **2522**.
See also Books, parasitology.
FLEECE ROT. See Wool.
FLIES. Control of larvae in manure, **1473**; effect of biting fly control on milk production, **2525**; **3998**; weight response in cattle to control of horn and stable flies, **2526**; **3999**.
See also under specific names of flies, e.g. Glossina, Melophagus, Simulium, Stomoxys, Tabanus, etc., and under Blowflies and Fleshflies, Oestridae, etc.
FLUKES. See Books, parasitology; Calicophoron; Cymbiforma; Fasciola; Paramphistomum; Schistosoma.
FLUORESCENCE MICROSCOPY. See Technique, microscopy.
FLUORINE. See Nutrition, poultry; sheep.
FLUOROSIS. See Poisoning, inorganic.
"FLUOTHANE". See Bromochlorotrifluoroethane.
FOALS. See Horses, Donkeys and Mules.
FOETUSES. See Embryos, Mammalian.
FOLIC ACID. See Vitamins.
FOOD & AGRICULTURE ORGANIZATION (FAO). See Encephalomyelitis, Equine, eastern type; Reports, international.
FOOD HYGIENE. See Hygiene.
FOOD POISONING. See Hygiene, food; Salmonella Infection, general.
FOOT. Interdigital overgrowth in cattle, **1884**.
See also Bones, general; diseases; Heredity, cattle.
FOOT & MOUTH DISEASE.
General. In pigs in Kenya, **128**; complications and prevention, **405**; effect on milk quality, **406**; in pigs, **746**; in the Buenos Aires zoo, **1038**; prevention of spread from research institutes, **1761**; in Greece, **2116**; in Turkey, **2117**; heart lesions in urethane-poisoned mice after infection, **2463**; heat intolerance syndrome following attack, **2817**; control by slaughter in France, **2818**; specificity of lesions in infected g.pigs, **2821**; rumen lesions, **3560**; pathology of exp. infection, **3940**.
Immunology. Haemagglutination test, **84**; preservation of serum for use in c.f. test, **85**; avianized vaccine, **86**; **409**; concentrated vaccine, **410**; agar gel precipitin test, **1763**; **1764**; **2464**; losses in sheep following vaccination, **1039**; tissue culture vaccine, **1765**; Federal Vaccine Institute, Basle, **2118**; c.f. test, **2119**; i/d immunization of pigs, **2120**; local immunity, **2462**; dried antigen for c.f. test, **2822**; immunity in new-born calves, **2827**; i/d inoculation of vaccine in g.pigs, **2828**; outbreak in cattle one week after vaccination, **3203**; immunization in an infected area, **3205**; use of Belin vaccine in France, **3206**; i/d vaccination, **3212**; **3213**; trivalent vaccines, **3214**; bovine influenza, following immunization, **3228**; French vaccination statistics, **3564**; quinosol vaccine, **3565**; antigen formation in tissue culture, **3566**; serum electrophoresis, **3939**.
See also Foot and Mouth Disease, virus; Vesicular Diseases, General.
Virus. Avianized, **86**; multiplication in bovine tissue cultures, **407**; **1765**; **1766**; inactivation by formaldehyde and changes in pH and temp., **408**; passage in leeches, **747**; propagation in ox tongue tissue culture, **1040**; plaque assay, **1413**; exp. infection in cattle with mixed viruses, **1762**; use of tissue culture in research, **2121**; plaque technique, **2122**; persistence in tissues of slaughtered pigs, **2819**; survival in deep-frozen bacon, **2820**; typing and cultivation, **2823**; tissue culture in pig kidney, **2824**; interference between cytopathogenic and noncytopathogenic particles of virus, **2825**; modification of pathogenicity and antigenicity in new-born rabbit passages, **2826**; variation, **3204**; isolation of virus during incubation period, **3207**; activating and protecting effects of some substances, **3208**; purification and electron microscopy, **3209**; titration by tissue culture methods, **3210**; tissue culture vaccines, **3211**; type variation and immunization, **3215**; behaviour during freezing and thawing in various media, **3561**; modification of virulence by rabbit passage, **3562**; immuno-electrophoresis, **3563**.
FOOT ROT. Eradication, **384**; **1020**; contagious, in sheep, **385**; antibiotic treatment in sheep, **2067**; differential diagnosis and treatment, **2440**; terramycin treatment, in sheep, **3163**.
See also Dermatophilus Infection; Fusiformis Infection.
FOREIGN BODY SYNDROME, CATTLE. Treated with orally administered magnets, **3355**.
FORMALDEHYDE. Effect of excessive fumigation on poults, **1912**.
See also Blood, general; Foot and Mouth Disease, virus.
FOWL CHOLERA. See Pasteurella Infection, avian.
FOWL PARALYSIS & AVIAN LEUCOSIS COMPLEX. Review, **838**; avian leucosis complex, **2554**; recent investigations, **3303**; control, **1500**; new transmissible strain, **185**; occurrence of visceral lymphomatosis virus in the eggs of hens and of their progeny, **186**; visceral lymphomatosis virus in saliva and faeces of normal and lymphomatous birds, **187**; transmission of visceral lymphomatosis, **839**; **1501**; electron microscopical study, **1145**; ultrastructure of viruses of myeloblastosis and erythroblastosis, **2222**; tissue culture of visceral lymphomatosis virus, **2223**; **2224**; **2931**; **2932**; visceral lymphomatosis in turkeys, **2929**; comparative study of poliomyelitis and neurolymphomatosis, **2930**; histological reaction following transplantation of lymphoma RPL-16, **3304**; egg transmission, **3657**.

FOWL PLAGUE. Formation of antigens studied with fluorescent antibodies, 1438; multiplication in pig kidney tissue culture, 1456; study of labelled virus, 2500; cultivation and transformation of fowl plague virus in HeLa cell explants, 2870; factors affecting plaque formation, 2871.
See also Newcastle Disease.
FOWL POX & DIPHTHERIA. See Pox Diseases.
FOWLS.
General. See Anaesthesia and Analgesia; Antibiotics, General; Behaviour of Animals; Blood, general, composition; corpuscles (red); pressure; Circulatory System, heart; Fabricius, Bursa of; Genital System, ovaries; Growth, general; growth factors; Light; Meprobamate; Moulting; Respiratory System, lungs; Salivary Glands; Technique and Apparatus, miscellaneous; Temperature, environmental; Water; Zinc.
Arthropod parasites. In broilers, 3992.
See also Books, parasitology; Eomenacanthus; Ornithonyssus.
Bacterial & fungous diseases. See Brucella Infection, avian; Candida Infection; Escherichia Coli Infection; Fungi, General; Haemophilus Infection; Histoplasma Capsulatum Infection; Klebsiella; Leptospira Infection, avian; Paracolobactrum Aerogenoides; Pasteurella Infection; Respiratory System, diseases; Salmonella Infection, avian; Salmonella Gallinarum Infection; Salmonella Pullorum Infection; Spirillum; Spirochaeta Infection.
Diseases, general. Mortality in fowls during first laying year, 2989.
See also Anaemia, General; Books, diseases, general; Diabetes; Diathesis, Exudative; Encephalomalacia, Avian; Eyes, diseases; Frost-Bite; Haemorrhagic Syndrome; Heredity; Keratoconjunctivitis, General; Poisoning, general; therapeutics and agricultural chemicals; Round Heart Disease; Teratology.
Helminth parasites. In broilers, 3992.
See also Anthelmintics, for poultry; Physocephalus; Books, parasitology; Heterakis; Subulura.
Protozoan diseases. See Eimeria Infection, in fowls; treatment; Plasmodium Infection; Toxoplasma Infection.
Virus & rickettsial diseases. See Anaemia, General; Bronchitis, Avian Infectious; Chick Embryo Lethal Orphan Virus; Encephalomyelitis, Avian (Epidemic Tremor); Fowl Paralysis and Avian Leucosis Complex, Fowl Plague; Hepatitis, Avian Infectious; Laryngo-Tracheitis, Avian Infectious; Neoplasms, in poultry; Newcastle Disease; Pox Diseases, fowl pox; Psittacosis-Lymphogranuloma Group; Pullet Disease; Synovitis, Infectious of fowls.
FOWL TYPHOID. See Salmonella Gallinarum Infection.
FOXES. See Echinococcus; Encephalitis, General; Hepatitis, Canine Virus; Leptospira Infection, treatment; Mange, general; Mycobacterium Tuberculosis Infection, general; Rabies, general.
FRACTURES. See Bones, diseases.
FRANCAIELLA. From cattle in Slovakia, 1034; 3930; localization of piroplasms in cattle, 2102; haemosporidial infections in cattle in Moscow, 2103; berenil and antrycide treatment in cattle, 2810; 2811.
FRANCE. See Encephalomyelitis, Avian; Foot and Mouth Disease, general; immunology; Mycobacterium Tuberculosis Infection, general; Psittacosis-Lymphogranuloma Group; Rhino-Tonsillitis, Canine Contagious; Ticks, general; Trichomonas Infection, cattle.
FREEZING, FREEZE-DRYING & REFRIGERATION. Viability of tissues and cells after freezing, 1607; equipment for large-scale laboratory use, 2697.
See also Cysticercus; Eyes, general; Nematodes, General; Semen and Spermatozoa, storage.
FRENCH GUIANA. See Rabies, general.
FROGS & TOADS. See Pregnancy, diagnosis.
FROST-BITE. Treatment in fowls with microwaves, 1553.
FRUCTOSE. See Nutrition and Metabolism, cattle.
FUNGI, GENERAL. Animal mycoses, 1729; a disease of pigs and cattle caused by ingestion of mouldy maize, 1730; fusariotoxicosis in piglets, 1731; exp. avian infections, 3174; presence in abomasal ulcers in calves, 1022; antifungal activity of pentamidine and stilbamidine, 393.
See also Antibiotics, General; Arthrobotrys; Asterococcus; Books, mycology; Dermatophilus Infection; Mastitis, Mycotic; Neoplasms, in dogs; Poisoning, plants; skin, diseases; Technique, staining.
FURACILLIN. See Trypanosoma Infection, treatment.
FURACIN. See Eimeria Infection, treatment and control.
FURAZOLIDONE. See Eimeria Infection, treatment and control; Poisoning, therapeutics; Pregnancy, general; Psittacosis; Salmonella Infection, avian; Salmonella Pullorum Infection.
FUR-BEARING ANIMALS. See Clostridium Infection, general; Leptospira Infection, general; Mink; Mycobacterium Tuberculosis Infection, general; Neoplasms, general; Pasteurella Infection; Salmonella Infection, general; Toxoplasma Infection, general.
FUSARIUM. See Fungi, General.
FUSIFORMIS INFECTION. Probable cause of stomatitis in lambs, 1385; endemic cerebral infection in sheep, 2068.
See also Foot Rot; Vitamins, vitamin K.

G

"GAMACID". See Parasiticides, chlorinated hydrocarbons.
GAMBIA. See Reports.
GAMMA GLOBULIN. See Embryos, Mammalian, and Foetuses; Immunology, general; Influenza, swine.
GAMMA RAYS. See Radiations.
GAPEWORMS. See Syngamus.
GAS GANGRENE. See Clostridium Welchii Infection.
GASTEROPHILUS. See Oestridae.
GASTRO-ENTERITIS, GENERAL. See Escherichia Coli Infection, swine.
GASTRO-ENTERITIS, PORCINE TRANSMISSIBLE. See Diarrhoea, Porcine Virus; Enteritis, Porcine.
GEESE. See Acuaria; Mycobacterium Tuberculosis Infection, general; Newcastle Disease, general; Physocephalus; Poisoning, therapeutics; Psittacosis; Salmonella Infection, avian.
GENETICS. See Heredity.
GENITAL SYSTEM.
General. Properties of fluids from cows' genitalia, 622; 1621; diseases in cattle in Russia, 2344; organs, in Finnish cattle, 2345; congenital malformation of Müllerian ducts and sinus urogenitalis in pigs, 2690; examination in female goats and sheep by peritoneoscopy, 3436.
See also Exanthema, Coital; Hermaphroditism; Pineal Body; Vibrio Fetus Infection.
Corpus luteum. Expression, 1630; 1962; factors determining number, 2352.
Epididymis. Histology and cytochemistry in stallion, ram and bull, 2674.
See also Brucella Infection, sheep and goats; Escherichia Coli Infection, goats.
Oestrous cycle. And infertility in mares, 626; effect of rams on oestrus, 935; effect of gonadotrophins, oestrogens and vitamin E on anoestrus in sows, 944; stimulation of oestrus and fertilization during anoestrus in ewes, 1627; exteroceptive factors in mice, 2347; effect of cerebral lesions in ferrets, 2348; crystallization patterns of cervical mucus, and oestrus in cows, 3437; vaginal cytology of the ewe during oestrus, 3438; pattern in relation to fertility data, 3776; effect of tranquillizers on sexual cycle in mice, 4100; induction of oestrus and stimulation of ovulation in mares, 4141.
See also Behaviour of Animals; clover; Escherichia Coli Infection, general; Genital System, ovaries, ova and ovulation; vagina and vulva.
Ovaries, ova & ovulation. Transfer of ova in sheep, 291; 2666; induced superovulation in sheep, 3777; anatomy of ovary in pigs, 604; effect of presence of rams on oestrus and ovarian activity, 935; cystic ovaries in cattle, 947; 1628; 1629; 3447; early ovarian development in fowls, 1602; ovarian function in cows, 1620; Cu, Ni and Fe content of ovaries in sows during oestrus, 1938; perivascular spaces in interstitial ovarian tissue, 1939; mechanism of ovulation, 2349; 2667; 2668; 2669; culture of tubal ova, 2350; transport through rabbit oviduct, 2351; egg development in rabbits, 2670; abnormalities of egg maturation and fertilization in mice, 3448; ovarian corpora albicantia in cows, 3788; mechanism of ovulation in rabbits, 4137.
See also Fertilization; Genital System, oestrous cycle; Moulting; Neoplasms, in swine; Sex Hormones, gonadotrophins; oestrogens.
Penis. Adherence of penis and sheath in castrated oxen, 1245.
See also Chlorpromazine; Genital System, prepuce.
Placenta & foetal membranes. Factors responsible for retention in cows, 298; vascularization in ovine and bovine caruncles, 3420; 4138; postparturient uterine motility and retention of foetal membranes, 3440.
See also Bronchitis, Avian Infectious; Embryos, Fowl; Embryos, Mammalian, and Foetuses; Iron; Pox Diseases, canary pox; Sex; Technique and Apparatus, viruses and rickettsia.
Prepuce. Function of the preputial sac in pigs, 3755; persistent frenulum in boars, 3789; balanoposthitis in bulls, 3960; sheath rot in rams, 4069.
See also Insemination, Artificial, cattle; swine; Neoplasms, general.
Prostate gland. Morphology and histology, in dogs, 3043; hypertrophy, in dogs, 3044; effect of stilboestrol in dogs, 3045.
Scrotum. Temp., in bulls, 2343.
Semen & spermatozoa. See Semen and Spermatozoa.
Testicles. Cytology of spermatogenesis, 289; biopsy in cattle and pigs, 296; diagnosis of cryptorchidism in pigs by rectal palpation, 297; bovine testicular mucopolysaccharase, 605; internal secretory capacity in cryptorchid g.pigs, 619; effect of unilateral orchidectomy on the remaining testis, 620; embolic displacement of viable testicular tissue in cockerels, 621; thermoregulation of

GENITAL SYSTEM—Testicles—[cont'd.]
testis at high temp., 933; histochemistry of glycogen, and spermatogenesis, 934; secretory epithelium in the bull, 1952; testicular temp. in bulls, 2343; atrophy in stallions, 4149.
See also Brucella Infection, general; sheep and goats; swine; Neoplasms, in dogs; Sterility, goats; Tissue Culture.
Uterus. Structure and function in the sow, 264; hormonal relaxation of cervix in sows, 2357; uterine blood flow in pregnant sheep, 2671; histology of uterine mucosa in cows, 3047; activity of the cervix in ruminants, 919; activity of endometrial secretions from mice, 1959; cystic hyperplasia and pyometra in bitches, 1622; abnormal endometrial condition in a bitch, 2356; quinine for canine pyometra, 625; water increase in rat uterine tissues after relaxin treatment, 586; oestrogen-induced uterine metaplasia, 2358; 2359; motility and reactivity of oestrogenized rabbit uterus in vivo, 3787.
See also Adrenal Gland, medullary hormones; Blood, corpuscles (white); Escherichia Coli Infection, general; Genital System, placenta; Parturition; Sex Hormones, general; oestrogens; Sterility, cattle.
Vagina & vulva. Treatment of prolapse in cows with "Prolapsan", 292, prolapse in ewes, 2346; bacterial flora in healthy cows, crystallization patterns of NaCl in bovine cervical mucus, 271; pH of vaginal secretions in buffaloes, 4139.
See also Genital System, oestrous cycle; Neoplasms, in dogs; Parturition; Sterility, cattle and buffaloes; Vaginitis, Bovine Virus.
GERMANY. See Clostridium Tetani Infection; Committees, Conferences and Congresses; Salmonella Group Clostridium Welchii Infection; Mycobacterium Tuberculosis Infection, general; Salmonella Infection, general.
GHANA. See Onchocerca.
GIRAFFES. See Mycobacterium Tuberculosis Infection, general.
GLANDERS. See Pfeifferella Mallei Infection.
GLOBIDIUM. G. gilruthi in sheep in Turkey, 3926.
GLOSSINA. East African Trypanosomiasis Research Organization Report, 727; lab. colonies of G.austeni and G. morsitans, 2198; eradication of G. morsitans submorsitans in Northern Nigeria by chemical means, 3271; control in Uganda by game elimination, 3617; control of G. palpalis fuscipes in Kenya, 3618; G. morsitans in Uganda, 4000; effect of sterilized males on population, 4001.
GLUCAGON. See Blood, composition.
GLUCOSE. Pentose cycle as pathway for glucose metabolism in lactating cows, 270; inhibition of uptake by acidosis in vitro, 3316.
See also Alpacas, Llamas and Vicuñas; Blood, composition.
GLUTAMIC ACID. See Amino Acids.
GLYCAEMIA. See Blood, composition.
GLYCEROL. Fate of i/v administered glycerol, 571; effect on toxicity of isoniazid-streptomycin mixtures, 2629.
See also Semen and Spermatozoa, general.
GLYCINE. See Blood, composition; Vitamins, vitamin B (folic acid).
GOAT POX. See Pox Diseases, goat pox.
GOATS.
General. See Behaviour of Animals; Blood, Composition; corpuscles (red); haemoglobin; Circulatory System, general; Digestive System, ruminant digestion; Genital System, general; Insemination, Artificial; Mammary Gland; Parathyroid Glands; Pituitary Gland; Pregnancy, diagnosis; Semen and Spermatozoa, general; Sex Hormones, oestrogens; Strontium; Taste; Temperature, environmental; Thyroid Gland.
Bacterial & fungous diseases. See Brucella Infection, diagnosis; immunology; sheep and goats; treatment; Clostridia, General; Erysipelothrix Monocytogenes Infection; Escherichia Coli Infection; Leptospira Infection, sheep and goats; Mastitis, Caprine; Nocardia; Pleuropneumonia, Caprine Contagious; Salmonella Infection; Sterility.
Diseases, general. See kidneys.
Helminth parasites. See Helminth Parasites, General; Hyostrongylus; Strongyloides; Trichuris.
Protozoan diseases. See Eimeria Infection, sheep and goats; treatment and control.
Virus & rickettsial diseases. See Encephalitis, General; Pneumonia, Caprine Virus; Pox Diseases; Rickettsia Infection, heartwater; Scrapie.
GOITRE. See Thyroid Gland.
GOLD COAST. See Ghana.
GONADOTROPHINS. See Sex Hormones.
GONDERIA INFECTION ("CORRIDOR DISEASE"). Exp. transmission of G. lawrenci infection by Rh. appendiculatus, 3554; Theileria, Gonderia and Cytauxzoon infection, 3935.
GOSSYPOL. See Poisoning, plants.
GRAFTING, SKIN. See Skin, general.
GRANULOMA. See Escherichia Coli Infection, avian; Mucor; Neoplasms.
GRAPES, VINE. Characteristic syndrome following excessive consumption by cows, 510.
GRASSES. Disease caused by feather-grass awns, in cattle, 879; calcium content, 1167.
See also Digestive System, ruminant digestion; Pastures and Grazing.
GRASS SICKNESS. A suspected case in a horse, 1156.
GRASS STAGGERS. See Poisoning, plants.
GRASS TETANY. See Magnesium.
GRAZING. See Behaviour of Animals; Pastures and Grazing.
GREECE. See Echinococcus; Foot and Mouth Disease, general; Leptospira Infection, swine.
GREY LUNG VIRUS. See Pneumonia, General.
GROWTH.
General. Problems in farm animals, 3737; relationship between water consumption and weight gains in pigs, 506; "unthriftiness" in weaner lambs, 509; growth and reproduction in worm-free sheep, 1825; depression in chicks caused by a detergent, 848; water fluoridation and chick growth, 1507.
See also Amino Acids; Meprobamate; Poisoning, therapeutics.
Growth factors. Cyanocobalamin and antibiotics in animal nutrition, 518; antibiotics for unweaned calves, 1513; effect of aureomycin in ration of lambs on growth and pneumonia, 517; aureomycin for calves, 1151; 2941; effect of PAS and/or chlortetracycline on calves, 1153; antibiotic supplements for pigs, 3664; antibiotic and copper supplements for fattening pigs, 1154; 2565; effect of housing on effect of dietary supplements in pigs, 1514; liver and spleen preparations as stimulants for piglets, 2628; effect of antibiotics on chicks, 1839; surface-active agents in broiler diets, 3667; oleandomycin in poultry rations, 4053; lack of growth promoting activity of inactivated penicillin, for turkeys, 1152; effect of procaine penicillin on white cells in chicks, 2568; serum response in chicks to oral dosage with aureomycin, 2567; different response in chicks and turkeys to different antibiotics, 2566; effect of DPPD on growth rate and pigmentation in fowls, 1840; effect of high levels of chlortetracycline on laying hens in hot weather, 843; pyridine derivatives for ducklings, 212; chlortetracycline for g.pigs, 1838; use of tissue preparations described by Filatov as stimulants, 1575-1576; harmlessness of orally administered keratin hydrolysate, 3319; malt distillers' dried solubles, 3666; 4049.
See also Antibiotics, General; Digestive System, fauna and flora; Nutrition and Metabolism; Sex Hormones, general; oestrogens.
Growth hormones. Serotonin and indoleacetic acid, 2330.
See also Lactation.
GUAIACOL GLYCEROL ETHER. A muscle relaxing agent, 3018.
GUINEA PIGS. See Corynebacterium Infection, general; Growth, growth factors; Nutrition and Metabolism, general; Salmonella Infection, general.
GULLS. See Psittacosis; Salmonella Infection, avian.
GUTIERREZIA MICROCEPHALA (BROOMWEED). See Poisoning, plants.
GUT OEDEMA. See Oedema Disease of Pigs.

H

"HAEMAGGLUTINATING VIRUS OF JAPAN". Propagation in tissue culture, 2859.
HAEMANGIOENDOTHELIOMA. See Neoplasms, in swine.
HAEMANGIOPERICYTOMA. See Neoplasms, in dogs.
HAEMAPHYSALIS. See Ticks, Ixodidae.
HAEMATOPINUS. Control in pigs with malathion, 3994.
HAEMATURIA, BOVINE CHRONIC. Distribution of ^{32}P in healthy cows and in cows with haematuria, 1882; clinical and chemical research, 2974; 2975.
See also Neoplasms, in cattle.
HAEMOGLOBINURIA. See Clostridium Infection, cattle.
HAEMOLYTIC DISEASE OF NEW-BORN. Book, comparative aspects, 644; haemolytic anaemia in baby pigs, 465; 466; exp., in mice, 1797.
HAEMONCHUS. Immunity in sheep, 163; intestinal cell fat content and infectivity of H. placei larvae, 1119; effect of minerals and phenothiazine on resistance of lambs to H. contortus, 1121; effect of bleeding or previous infection on resistance of lambs, 3282; H. placei in calves, 3633; in Kenya, 2912; H. longistipes in a camel, 3281; phenothiazine resistance, 4025.
HAEMOPHILUS INFECTION.
General. Establishment of a rat colony free from chronic pneumonia, 678.
Cattle. H. bovis from infectious kerato-conjunctivitis in India, 676; 677.
Fowls (coryza). Antibiotics for contagious fowl coryza, 679; 3166.
Swine. A haemophilus-like organism isolated from pig lung and associated with pneumonia, 347.
HAEMORRHAGIC SEPTICAEMIA. See Pasteurella Infection.

HAEMORRHAGIC SHOCK. See Shock.
HAEMORRHAGIC SYNDROME. In chicks fed sulphaquinoxaline, 569; in chicks fed trichlorethylene-extracted soya meal, 570; haemorrhages in chicks due to beta-aminopropionitrile and sulphaquinoxaline, 1907.
See also Poisoning, plants.
HAIR. Hair measurement beta gauge, 628; hairlessness in piglets, 949; dietary hair loss in livestock, 1214; endocrine factors and hair growth in rats, 3405; effect of trauma on hair growth, 3738.
See also Copper; Embryos, Mammalian, and Foetuses; Heredity, general; Manganese.
HAMSTERS. See Nutrition and Metabolism, general.
HANSENULA. See Mastitis, Mycotic.
HARD PAD DISEASE. See Distemper, Dog.
HARES. See Brucella Infection, general; Leucosis, general; Spirochaeta Infection.
HEART. See Circulatory System.
HEARTWATER. See Rickettsia Infection.
HEARTWORM. See Dirofilaria.
HEAT REGULATION. See Temperature.
HEDGEHOGS. See Leptospira Infection, general; Rabies, general.
HELIOTRINE. See Poisoning, plants; therapeutics.
HELMINTH PARASITES, GENERAL. Survey in domestic animals in India, 157; survival of eggs and larvae in silage, 174; in sheep, goats and cattle, 175; geographical distribution of protostrongylids, 815; snails as intermediate hosts of protostrongylids, 816; West of Scotland Agric. College report, 957; in cattle and pigs in Malaya, 1138; check-list of helminths from livestock in Malaya, 1493; mucopolysaccharidase in penetrating larvae, 1809; human diseases from worms of dogs and cats, 3291; U.N. report on control of parasitic diseases to the Government of the Rhodesia-Nyasaland Federation, 3621.
See also Parasitology; Hygiene, food; Nematodes, General; Tapeworms; Technique and Apparatus, parasitological.
HEPATITIS, AVIAN INFECTIOUS. Clin. picture, pathology, cause and treatment, 3252; 3253; 3254.
HEPATITIS, CANINE VIRUS. Agar gel precipitin test 2163; epidemiology, 2863; haemagglutinins, 432; 2165; histopathology, 2490; inclusion bodies, 3241, immunization, 2164; immunization of dogs with tissue culture virus, 131; incidence and immunization in Japan, 1071; in unweaned puppies, 2861; isolation from dog's tonsils, 2860; hepatic necrosis and appearance of jaundice, 2862; propagation in tissue culture, 433; 1784; 2864; infection experiments with two strains of virus, 2491; experimental, in foxes, 132.
HEPATITIS, DUCK VIRUS. Pathology, 1447; in Belgium, 2507; in Germany, 2881; in Italy, 2880.
HEPATITIS, GENERAL. See Liver, diseases.
HEPATITIS, MOUSE VIRUS. Tissue culture, 2166; nutritional factors, 3245.
HEPATOCEREBRAL DISEASE OF HORSES. See Liver, diseases.
HEPATOZOON. H. griseisciuri from grey squirrels, 2461.
HEREDITY.
General. Mutant genes of the mouse, 302; genetic loads in natural populations, 303; genes in mammalian development, 952; role in reproduction, 1271; sex chromosomes and human sexual development, 1273; 'ragged' mutant of mice, 3792.
See also Bones, diseases; Books, heredity; Epilepsy; Immunology, antibodies and antigens; Muscles.
Cattle. Hereditary dwarfism in Aberdeen Angus, 1274; hereditary defect of hooves and tongue, 1635; new lethal gene, 1964; lumbar vertebrae in normal and snorter dwarf calves, 2362; atresia ilei, a lethal defect, 3057.
See also Genital System, ovaries, ova and ovulation; Neoplasms, in cattle; "Stringhalt"; Teratology.
Dogs. Mid-dorsal dermoid sinuses in Rhodesian Ridgebacks, 1636.
See also Ataxia; Blood, corpuscles (red); Dysplasia, Hip.
Poultry. "Scaleless", an ectodermal defect, 1966; deoxyribonucleic acid and genetic modification in ducks, 2687; black abdomen in broilers, 3450.
See also Encephalomalacia, Avian; Kidneys, diseases.
Sheep. See Trichostrongylus.
Swine. Congenital deformity of tail, 1965; hermaphroditism and genital malformations in pigs, 2363.
See also Genital System, general; Trembling of Piglets.
HERMAPHRODITISM. And other genital malformations in pigs, 2363.
HERNIA. Spontaneous, axillary, in turkeys, 2613.
HETERAKIS. "Self-cure" in fowls and turkeys, 4032.
See also Anthelmintics, for poultry; Histomonas Meleagridis Infection.
HEXACHLOROPHENE. See Disinfection and Disinfectants.
HEXYLRESORCINOL. Bactericidal action of aerosols, 2789.
See also Anthelmintics, for dogs.
HIBERNATION. And heat regulation, 1918.
HIDES. See Elaeophora; Oestridae, Hypoderma; Sex Hormones, general; Skin; Streptothricosis, Cutaneous.
HISTAMINES. Histamine-fixing ability of horse serum, 3028.
See also Circulatory System, heart.
HISTOMONAS MELEAGRIDIS INFECTION (BLACKHEAD). Factors influencing resistance, 734; exp. pathology, 1746; chemotherapy, 3916; embryonation and infectivity of infected Heterakis eggs, 3917; growth and development of Heterakis gallinae in turkeys and fowls with blackhead, 3918; blood-induced infection, 3919.
HISTOPLASMA CAPSULATUM INFECTION. Histoplasmin testing, 718; exp. infection of pigeons and fowls, 1733; histoplasmin-latex agglutination test, 3900.
HISTOPLASMA FARCIMINOSUM INFECTION (EPIZOOTIC LYMPHANGITIS). Protoanemonin treatment in horses, 2793.
HISTORY. See Books, miscellaneous.
HJÄRRE'S DISEASE. See Escherichia Coli Infection, avian.
HOG CHOLERA. See Swine Fever.
HOLLAND. See Netherlands.
HOLOTRICHS. See Digestive System, ruminant digestion.
HONDURAS, BRITISH. See Reports.
HOOKWORMS. See Ancylostoma.
HOOVES. See Foot; Heredity, cattle.
HORNFLIES. See Flies; Siphona.
HORSERADISH. See Mycobacterium Tuberculosis Infection, treatment.
HORSES, DONKEYS & MULES.
General. See Anaesthesia and Analgesia, general; Blood; Bones, general; Digestive System, intestines; Genital System, epididymis; oestrous cycle; Grass Sickness; Nervous System, brain; Parathyroid Glands; Parturition; Respiratory System, general; Semen and Spermatozoa; Skin, general; Urinary System, urine; Vitamins, vitamin E; Water.
Arthropod parasites. See Oestridae, Gasterophilus; Hypoderma.
Bacterial & fungous diseases. See Clostridium Infection; Clostridium Tetani Infection, horses; Corynebacterium Infection; Cryptococcus; Histoplasma Farciminosum Infection; Leptospira Infection; Microsporum Infection; Mycobacterium Tuberculosis Infection, general; tuberculin test; Pasteurella Infection; Penicillium; Salmonella Infection; Streptococcus Equi Infection (Glanders); Streptococcus Infection; Ždár Disease.
Diseases, general. Convulsive and allied syndromes in new-born foals, 2970.
See also Blood, groups; Bones, diseases; Circulatory System, general; Encephalomalacia, General; Genital System, testicles; Joints; Leucosis; Liver, diseases; Muscles; Neoplasms; Nervous System, diseases; Ophthalmia, Equine Periodic; Phenylbutazone; Poisoning, plants; Skin, diseases; Sterility; Sweating and Sweat Glands; Teratology; Ždár Disease.
Helminth parasites. Presence of Strongylus, Poteriostomum and Triodontophorus in Sardinia, 807.
See also Dictyocaulus.
Protozoan diseases. See Babesia Infection; Eimeria Infection; Nuttalia; Trypanosoma Infection, treatment.
Virus & rickettsial diseases. See Abortion, Equine Virus; Anaemia, Equine Infectious; Borna Disease; Encephalomyelitis, Equine; Epidemic Cough; Encephalomyelitis, Equine; Influenza.
HORSESICKNESS, AFRICAN. Complicated by distemper, in foxhounds, 1055.
HORSEFLIES. See Flies.
HOUSING OF LIVESTOCK. See Hygiene, livestock.
"HUMP SORES". See Stephanofilaria.
HUNGARY. See Abortion, Ovine Virus; Clostridium Welchii Infection, in pigs; Leptospira Infection, dogs; swine; Lungworms.
HUSBANDRY, ANIMAL. See Zootechny.
HYALOMMA. See Rickettsia Infection, Q fever; Ticks, Ixodidae.
HYALURONIDASE. See Erysipelothrix Rhusiopathiae Infection, treatment; Trypanosoma Infection, treatment.
HYBRIDS. Check list and bibliography of bird hybrids, 3468.
HYDATID DISEASE. See Echinococcus.
HYDRANENCEPHALY. See Teratology.
HYDROCARBONS, CHLORINATED. See Parasiticides.
HYDROCEPHALUS. See Vitamins, vitamin A; vitamin B_{12}.
HYDROGEN SULPHIDE. See Bacteria, General.
"HYDROXDIONE". See Anaesthesia and Analgesia.
17-HYDROXYCORTICOSTEROIDS. See Ketosis.
21-HYDROXYPREGNANEDIONE SODIUM SUCCINATE. See Anaesthesia and Analgesia.
HYGIENE.
Food. Urea content of pork as indicator of health or disease, 121; demonstration of bact. toxins in meat, 275-277; advisory group on veterinary public health (WHO), 278; preservation by antibiotics, 923; 2331; preservation by irradiation, 924; plating method for

HYGIENE—Food—[cont'd.]
detection of infection in animal tissue, **1251**; chromatography and electrophoresis for the study of ripening in carcasses, **1252**; oxytetracycline in meat preservation, **1253**; zoonoses and meat inspection, **1608**; **4018**; **4127**; pre-slaughter treatment of beef, **1943**; **1944**; **1945**; preservation of poultry meat with aureomycin, **2656**; **2657**; spoilage control in poultry carcasses with antibiotics before slaughter, **4129**; bacteriological meat inspection in N.W. England, **3034**; antibiotics as meat preservatives, **3429**; synthetic hormones and meat production, **3762**; fate of labelled insecticide residues in food products, **4095**; Windscale accident, **3428**.
See also Books, food hygiene; Brucella Infection, general; sheep and goats; Brucella Tularensis Infection; Clostridium Infection, general; Cysticercus; Eggs, Hen; Escherichia Coli Infection, general; Milk and Milk Products; Mycobacterium Tuberculosis Infection, general; Nematodes, General; Radiations; Rickettsia Infection, Q fever; Rinderpest; Salmonella Infection, general; Strontium; Toxoplasma Infection, general.
Livestock. Air replacement and movement in byres, **280**; fans for cooling cattle, **608**; humidity of farm buildings, **2332**; water sprinklers for cooling pregnant sows, **2333**; hatchery sanitation, **3796**.
See also Brucella Group; Disinfectants, Antiseptics and Sterilization; Flies; Growth, growth factors; Mastitis, Bovine, general; Milk and Milk Products, hygiene; Mycobacterium Tuberculosis Infection, general; Parasiticides; Stomoxys; Temperature, environmental.
"HYGROMIX". See Anthelmintics, for swine.
HYMENOLEPIS. Study of H. diminuta in rats, **4015**; **4016**; role of slugs in H. microsoma infection in ducks, **4017**.
HYOSTRONGYLUS. H. rubidus in a calf fed larvae from pigs, **2539**; cross transmission of H. rubidus in rabbits and goats, **3632**.
HYPERCALCAEMIA. See Calcium.
HYPERGLYCAEMIA. See Clostridium Welchii Infection; Diabetes.
HYPERICUM. See Poisoning, plants.
HYPERKERATOSIS. See Poisoning, organic.
HYPOCALCAEMIA. See Calcium; Milk Fever.
HYPODERMA. See Oestridae.
HYPOGLYCAEMIA. Response of fowls to hypo and hyperglycaemic agents, **1877**.
See Ketosis.
HYPOGLYCIN. See Ketosis; Poisoning, plants.
HYPOMAGNESAEMIA. See Magnesium.
HYPOPHYSIS. See Pituitary Gland.
HYPOTHALAMUS. See Nervous System, brain; Semen and Spermatozoa, collection.

I

ICELAND. See "Visna".
IMMUNOLOGY.
General. Natural resistance and specific immunity to viruses, **780**; gamma globulin formation, **1085**; pea-hydrolysate medium for antigen and vaccine production, **1389**; lymphoid tissue and serum gamma globulin in germ-free chicks, **1467**; virus serology, **2123**; effect of chem. and physical treatment on haemolytic and c.f. properties of sera, **2187**; toxicity of heated pig serum, **2190**; role in biology and medicine, **2514**; effect of bact. constituents on resistance of mice to heterologous infection, **2730**; phenomena in parasitic infections, **2887**; relationship between method of treatment and subsequent immunity, **3085**; immunological attack on newly-hatched chicks by inj. of adult cells, **3264**; hypersensitivity to histone in rabbits, **3265**; properdin test and conglutinin, **3606**; immunological studies with tissue cultures, **3888**; acquired tolerance to bovine ribonuclease, **3983**; polymorphism in ovine beta-globulins, **3984**.
See also Blood, coagulation; Properdin; and under names of specific diseases.
Agglutination & haemagglutination. Haemolysin and haemolytic rate measured with radiochromium labelled cells, **2893**; effect of heating on agglutinins in milk, **2749**.
See also Blood, corpuscles (red).
Allergy & anaphylaxis. Anaphylaxis in mice, **467-469**; **785**; **2192**; nature of allergic reaction in mammals, **784**; comparison of endotoxin shock with anaphylactic shock, **1725**; anaphylactoid response of uterus and ileum of g.pigs inoculated with semen or testicular tissue, **2193**; viricidal disinfectants and haemagglutination, **2510**; acquired resistance to acquired allergic encephalomyelitis, **3988**.
Antibodies & antigens. Early phase of antibody response, **147**; antibody production in lab. animals, **148**; **2890**; **2891**; antibody production in vitro, **460**; **2889**; specific antibody and gamma globulin formation in vitro, **2183**; interpretations of antibody production, **1795**; serological adhesion, **457**; inheritance of antibody response, **458**; antibody response in chicks, **3607**; binding of hapten by antibodies, **1459**; antibody absorption from immune serum by the gut, **1460**; **3609**; absorption of heterologous antibodies from precipitating sera, **3982**; effect of complements on soluble antigen-antibody complexes, **1461**; action of spleen homogenates on antibody response to X-rays, **1465**; incomplete enterobacteria antibodies in umbilical cord blood, **2031**; antigen-antibody reactions and purification of proteins, **2182**; acquired tolerance to protein antigen in fowls, **2185**; acquired tolerance to azo protein in rabbits, **2186**; relation of eosinophils to antibody formation, **2516**; staining of complement and fluorescent antibody, **2518**; antibodies produced in response to sheep interstitial cell stimulating hormone, **2519**; virus-neutralization, virus-antibody interaction, **2883**; **2884**; effect of secondary injections on antigen retention in liver, **2888**; nature of antigen-antibody complexes in rabbits during response to bovine serum albumin, **2892**; role of antibody in haemolysis, **2894**; mode of action of antigens and other smooth-muscle stimulants, **3258**; stimulating action of soluble antigen-antibody complexes in g.pig smooth muscle, **3259**; isolation of antibodies on antigen-polystyrene conjugates, **3260**; biological activity of soluble antigen-antibody complexes, **3261**; chimeras and antibodies, **3266**; lyophilized antigens in parasitology, **3292**; photometric determination of virus and antibody concentration by erythrocyte aggregation, **3980**; removal of antigenic proteins from the bloodstream, **3989**.
See also Bacterium Anitratum; Fabricius, Bursa of; Radiations.
Complement & complement fixation. Complement activity of dog serum, **149**; interaction between internally labelled complement and specific precipitates, **462**; seasonal complement titres in g. pigs, **463**; modification of the drop c.f. test, **1277**; complement titre in different species, **2517**.
Helminth parasites. Review articles, **2547**; **2887**; serological response of sheep to nematodes, **484**; lyophilized antigens in parasitology, **3292**.
See also Ascaris; Cooperia; Cysticercus; Dictyocaulus; Haemonchus; Litomosoides; Strongyloides; Toxocara; Trichinella; Trichostrongylus.
Interfence phenomenon. See Interferon.
Maternal transfer. Of antibodies in cattle, **1796**.
See also Blood, groups; Clostridium Tetani Infection; Erysipelothrix Rhusiopathiae Infection, immunology; Leptospira Infection, cattle; Salmonella Infection, immunology; Swine Fever, immunology.
Precipitation. Study of some viruses by a modified Ouchterlony test, **445**; gel diffusion methods, **2180**; **2181**; **3604**; quantitative observations on antigen-antibody reaction in agar gel, **459**; slide gel-diffusion precipitin test, **3603**; triangular double diffusion precipitin test, **3605**; interaction between internally labelled complement and specific precipitates, **462**; precipitin formation in fowls, **461**; **1462-1463**; formation by one antigen of multiple zones of precipitate, **2515**.
See also Ascaris; Asterococcus; Bacillus Anthracis Infection; Brucella Infection, immunology; Cysticercus; Foot and Mouth Disease, immunology; Hepatitis, Canine Virus; Mycobacteria, General; Myxomatosis; Pox Diseases, cow pox; swine pox; Rabies, immunology; Sporotrichum; Taeniorhynchus.
Vaccines. FAO report to the Government of India on virus vaccine production, **144**; adsorption of viruses, **776-777**; inactivation of viruses by ionizing radiation and heat, **778**; testing for freedom from virulent organisms, **783**; use of beta-propiolactone, **1050**; antigenicity of combined beta-propiolactone and ultraviolet inactivated virus vaccines, **2882**.
See also under names of specific diseases.
INDIA. See Bacillus Anthracis Infection; Helminth Parasites, General; Immunology, vaccines; Mastitis, Caprine; Mycobacterium Tuberculosis Infection, general; Paramphistomum; Reports; Research Institutes; Setaria; Trichuris; Trypanosoma Evansi Infection (Surra); Wuchereria.
INDIGOFERA. See Poisoning, plants.
INDONESIA. See "Penjakit Ingusan".
INFERTILITY. See Sterility.
INFLUENZA.
Cattle. "Bovine Influenza" precipitated by F. and M. disease vaccination, **3228**.
Horses. Suspected Asian infection, **3576**; electron microscopy of virus A-equi, **3577**.
Swine. Virus G1 compared with viruses of human infection, **94**; virus diseases of pigs in Kenya, **128**; aetiological relationship with polybacterial hepatitis, **767**; aetiological relationship between certain types of gastro-enteritis and pneumonia in pigs, **1195**; measurements and antigenicity of human and swine influenza viruses, **2471**; gamma globulin-vitamin B therapy, **3965**.
Virus. Membrane piece technique for infectivity titration, **95**; phagocytosis in mice, **2130**; amino acid metabolism in chick chorioallantois infected with type A virus, **3221**.

INJECTION TECHNIQUE. Jet injection of joints, **307**; transmission of disease agents in spite of change of needles, **638**.
INSECTICIDES. See Parasiticides.
INSEMINATION, ARTIFICIAL.
General. Books, breeding problems and artificial insemination, **3076**; **3466**; influence of pH of rabbit semen on conception rate and sex ratio, **3040**; intraperitoneal, in g.pigs, **1618**.
See also Genital System; Semen and Spermatozoa.
Cattle. Annual reports, Netherlands, **281-282**; intraperitoneal, **618**; and fertility and disease control, **2334**; preputial lesions in bulls caused by vaseline, **2341**.
Goats. In the Netherlands, **1946**; optimal time, **3431**.
Poultry. Relation between fertility and dilution rate, **932**; in ducks, **2660**.
Sheep. See Semen and Spermatozoa, collection.
Swine. Using a dummy sow, **288**; artificial vagina for semen collection, **1947**; with frozen semen, **1948**; extirpation of preputial sac in insemination boars, **3771**.
INSULIN. See Blood, composition; corpuscles (white).
INTERFERON. Virus interference, **446-447**; production, mode of action and properties, **448**; further studies, **2131**.
INTESTINES. See Digestive System.
IODINE. Mechanism of iodide activity, **1539**.
See also Blood, composition; Neoplasms, in sheep; Nutrition, poultry; Protein; Radiations; Thyroid Gland.
IRAN. See Persia.
IRAQ. See Keratoconjunctivitis, Bovine Infectious; Leishmania Infection.
IRELAND, REPUBLIC OF. See Brucella Infection, general; Cobalt; Copper.
IRON. Action of manganese on Fe utilization in rabbits and lambs, **204**; anaemia in calves, **205**; requirements of calves, **2955**; siderosis from prolonged Fe administration, **246**; effects of massive dosage in rats, **523**; effect of age and sex on Fe storage in rats, **853**; cortical siderosis in goat kidneys, **1865**; interrelationship with vitamins C and E, **1866**; interrelationship with DPPD, **1867**; Fe cycle in rats, **2249**; accummulation in organs of rats, **2250**; haemoglobin content in Fe deficiency, **2584**; metabolism in pregnant rabbits and transport via placenta, **3322**; deposition in egg yolk, **3323**; absorption and metabolism, **4057**.
See also Anaplasma Infection; Genital System, ovaries; Poisoning, therapeutic substances.
IRRADIATION. See Radiations.
ISOANTIBODIES. See Blood, groups; Immunity.
ISONIAZID. Antitoxic action of glutamic acid on isoniazid, **2306**; Mycobacterium Tuberculosis Infection, treatment; Poisoning, therapeutics.
ISOTOPES, RADIOACTIVE. Radiophosphorus and radiosulphur in microbiology, **3456**.
See also Anaplasma Infection; Calcium; Disinfectants, Antiseptics and Sterilization; Embryos, Fowl; Haematuria, Bovine Chronic; Immunology, antibodies and antigens; Mycobacteria, General; Neoplasms, in sheep; Radiations.
ISRAEL. See Venoms.
ITALY. See Brucella Group; Brucella Infection, immunology; sheep and goats; Diarrhoea, Porcine Virus; Hepatitis, Duck Virus; Horses, helminth parasites; Leptospira Infection, cattle; Rickettsia Infection, cattle.

J

JAAGZIEKTE. Pulmonary adenomatosis in sheep, **1194**; **2218**; exp. transmission, **2923**.
JAMAICA. See Reports.
JAPAN. See Anaemia, Equine Infectious; Dirofilaria; Echinococcus; Fever, Bovine Epizootic; "Haemagglutinating Virus of Japan"; Psittacosis; Rinderpest.
JAUNDICE. See Liver, diseases; Poisoning, inorganic; plants.
JOHNE'S DISEASE. See Mycobacterium Johnei Infection.
JOINTS. Purulent arthritis and tendovaginitis in horses, **2609**; modification of acute lesions in g.pigs by A.C.T.H. and steroids, **2788**; agent isolated from pigs with arthritis, **3177**; rupture of the round ligament in hip joint of cattle, **3679**; degenerative diseases in castrated mice, **3707**; **3708**.
See also Dysplasia, Hip; Erysipelothrix Rhusiopathiae Infection, general; Immunology; Mycobacterium Tuberculosis Infection, treatment; Salmonella Pullorum Infection.

K

KALE. See Thyroid Gland.
KANGAROOS. See Mycobacterium Tuberculosis Infection, general; Vermin Control.
KEDS. See Melophagus.
KENYA. See Echinococcus; Foot and Mouth Disease; Glossina; Haemonchus; Influenza, porcine; Pneumonia, Porcine Virus; Pox Diseases, swine pox; Rabies; Reports, East Africa; Rickettsia Infection, general; Skin, diseases; Swine Fever, African; Theileria Infection.
KERATOCONJUNCTIVITIS, BOVINE INFECTIOUS. Isolation of Haemophilus bovis from cattle, **676**; **677**; in cattle in Iraq, **2741**.
See also Rickettsia Infection, cattle.
KERATOCONJUNCTIVITIS, GENERAL. In broilers, **1201**; **1889**.
KETOSIS. Some aspects, **218**; blood ketone bodies in normal cattle, **219**; determination of ketone bodies, **220**; **1542**; rumen volatile acids, **544**; glucose, ketone bodies, and fatty acids in blood of dairy cows, **545**; influence of endocrine glands on fatty acid and ketone body metabolism, **2969**; estimation of blood-acetone, **546**; effect of protein levels and energy intake, **865**; interrelationship between corticosteroids, plasma iodine and ketosis in cattle, **1184**; silage as possible factor, **3349**; acetylation of sulphanilamide in ketonaemic cows, **3353**; potassium permanganate treatment, **221**; prednisolone treatment, **1878**; comparison of glucose and prednisolone treatment, **2260**; effect of sodium propionate, **3351**; **3352**; production and treatment, **3696**.
See also Liver, general.
17-KETOSTEROIDS. Plasma studies in mice, **1931**; Ashbel and Seligman test, **2259**; and pseudoketosteroids in cattle, **3350**.
See also Swine Fever, general.
KIDNEYS. Comparative histology, **265**; "white-spotted kidney" in calves, **878**; radiology, **1206**; cortical siderosis in the goat, **1865**; renal clearance in cows, **2285**; susceptibility of fowls to renal disorders, **2689**; renal infarcts in cattle, **4066**.
See also Eimeria Infection, horses; Escherichia Coli Infection, general; Klossiella; Leptospira Infection, general; Neoplasms, in cattle; Nutrition and Metabolism, sheep; Poisoning, inorganic; plants; Potassium; Psittacosis-Lymphogranuloma Group; Streptococcus Infection, dogs; Tissue Culture; Toxocara.
"KISENYI DISEASE". Immunity and treatment, in sheep, **2150**; arthropod transmission, **3961**.
KLOSSIELLA. K. pneumoniae infection in chicks, **685**; kidney lesions in g.pigs, **2101**; K.equi infection of the kidneys in a zebra, **3202**.
KNACKERIES. A survey, in Devon, **1187**.
"KRAF". See Bones, diseases.

L

"L 13/59". See Parasiticides, general.
L FORMS OF BACTERIA. And penicillin resistance, **348**.
LABORATORY ANIMALS. Feeding, **192**; Laboratory Animals Bureau, collected papers, **223**; breeding and management of mice, **304**; UFAW handbook, **1991**.
See also Corynebacterium Infection, general; Erysipelothrix Monocytogenes Infection; Growth, growth factors; Haemophilus Infection; Heredity, general; Mange, general; Megacolon; Microsporum Infection; Nutrition and Metabolism, general; Rickettsia Infection, general; Ringworm; Sweating and Sweat Glands; Tail; Trichophyton; Virus B.
LACTATION. Milk production in sows, **255**; effect of oestrogen, thyroxine and growth factor on intensity of milk secretion, **909**; in cattle in tropics, **1240**; **2315**; induction in rabbits with reserpine, **1590**; oxytocin in lactating cows and goats, **1921**; physiology of milk production and lactational disorders, **2639**; control of milk ejection, **2640**; adrenalectomy, replacement therapy and lactation, in goats, **3026**.
See also Calcium; Glucose; Mastitis, Bovine, general; Poisoning, inorganic; Prolactin; Sex Hormones, oestrogens; Thyroid Gland.
LACTIC ACID. See Digestive System, ruminant digestion; Semen and Spermatozoa, general; Urinary System, urine.
LACTICODEHYDRASE. See Blood, composition.
LACTOSE. Synthesis, **1588**; **1589**.
See also Calcium.
LAMBS. See Sheep.
LAOS. See Rinderpest.
LARYNGO-TRACHEITIS, AVIAN INFECTIOUS. Virus propagation in tissue culture, **1079**; antibiotic treatment, **3166**; chick embryo infectivity, **3973**.
LARYNX. See Respiratory System.
LASIOCARPINE. See Poisoning, plants; therapeutic substances.
LATHYRUS. See Poisoning, plants.
LEAD. See Bones, diseases; Poisoning, inorganic.
LEAD ARSENATE. See Anthelmintics, for sheep; Poisoning, inorganic.
LECHWE (ADENOTA LECHE). See Mycobacterium Tuberculosis Infection, general.
LEECHES. As cause of death from anaemia in cattle, **3648**.
See also Foot and Mouth Disease, virus.

LEISHMANIA INFECTION. Purified antigen from Kedrowsky's bacillus for c.f. test, 2098; in foxhounds in Baghdad, 3196; exp., in dogs, with L. donovani, 3197; serum electrophoresis, 3544.
LEMMINGS [LAGARUS LAGARUS]. See Erysipelothrix Monocytogenes Infection.
LEPTOSPIRA ANDAMAN. See Leptospira Infection, avian.
LEPTOSPIRA CANICOLA. See Leptospira Infection, general; dogs.
LEPTOSPIRA HEBDOMADIS. See Leptospira Infection, cattle.
LEPTOSPIRA HYOS. See Leptospira Infection, swine.
LEPTOSPIRA ICTEROHAEMORRHAGIAE. See Leptospira Infection, general.
LEPTOSPIRA INFECTION.
General. Epidemiological patterns 3885; in Macedonia, 1369; in man in Croatia, 2060; L. pomona in opossum, 1712; L. pomona antibodies in cattle and deer in Massachusetts, 2423; wildlife carriers in Bohemia, 3883; hedgehogs as reservoir of L. pomona, 2427; 2769; control in foxes with serum, vaccine and antibiotics, 44; vaccination in cattle, pigs, sheep and horses, 1017; role of blood-sucking arthropods in L. icterohaemorrhagiae infection, 2058; diagnosis, 1710; allergic tests, 43; effect of reaction time and dead antigen on agglutination-lysis test, 1376; demonstration of L. canicola in hamster kidney by fluorescent antibody, 1715; positive serological tests in deer, 1724; macroscopic slide screening test for rapid serodiagnosis, 3157; penicillin treatment, 2771; treatment with cyanocobalamin and biomycin, 2425; action of antibiotics on L. icterohaemorrhagiae, 1714; survival outside hosts, 706; antileptospiral effect of milk, 376; L. monjakov identical with L. pomona, 2428; purification of contaminated cultures with membrane filters, 2429; isolation from kidney tissue, 2430; culture in bloodless media, 2059.
Avian. Failure of ducks to transmit infection to calves, 705; with L. andaman in fowls, 2770; exp. avian infection, 3884.
Cats. Serum agglutinins, 2057.
Cattle. In Canada, 373; 3513; in Italy, 704; failure of ducks to transmit L. pomona to calves, 705; immunization with pomona bacterin, 1017; 1371; antibody production by foetuses, 1372; vaccination of cows during pregnancy, 2424; 3882; L. sejroe infection, 2766; action of penicillin on hebdomadis infection in calves, 2767; simultaneous immunization of cattle against leptospirosis, virus diarrhoea and rhinotracheitis, 2851; in aborted foetuses, 3152; 3514; foetal infection and abortion, 3881. mastitis, 3880.
Dogs. In Glasgow, 375; in Budapest, 2055; serotypes in Hungary, 3515; serum agglutinins, 2056; in Italy, 3156.
Horses. Associated with abortion, 1370; immunization, 1017; hepatocerebral syndrome and Zdár disease, 1191-1193; with L. sejroe, 2765.
Sheep & goats. Treatment in sheep, 374; L. pomona infection, 1373; 2053; in sheep and goats in Central Africa, 1374; immunization, 1017.
Swine. Jaundice in piglets, 1375; pomona antibodies in pig serum, 1711; in Greece, 2768; L. hyos, cause of abortion in Hungary, 2054; with L. hyos and L. pomona in New Zealand, 3153; L. pomona infection, pathogenesis and pathology, 3154; 3155; immunization, 1017; terramycin therapy, 1713; treatment of leptospiruria, 2426.
LEPTOSPIRA MONJAKOV. See Leptospira Infection, general.
LEPTOSPIRA POMONA. See Leptospira Infection, general; avian; cattle; sheep; swine.
LEPTOSPIRA SEJROE. See Leptospira Infection, cattle; horses.
LEUCAENA. See Poisoning, plants.
LEUCINE. See Amino Acids; Leucosis, general.
LEUCOCYTOZOON INFECTION. Reactions against megaloschizonts of L. simondi in ducks, 1412.
LEUCOSIS.
General. In hares, 503; incorporation of leucine into normal and leucaemic white cells, 504; in mice by inj. of mouse brain filtrates, 837; failure to transmit mouse leucosis by trichinella, 1814; pathogenesis of transferred chloroleucaemia in rats, 3553.
Cattle. In Denmark, 501; aetiological role of Ranunculaceae, 502; bone marrow studies, 1143; aetiology, 2221; clin. diagnosis, 3302.
Dogs. In dogs and horses, 836; treatment of myeloid form, 1144.
Fowl. See Fowl Paralysis and Avian Leucosis Complex.
Horses. In dogs and horses, 836; lymphatic, 3656.
Swine. Following exposure to gamma radiation, 2928.
LEYDIG CELLS. See Brucella Infection, swine.
LICE. Control in cattle with residual sprays, 1469.
See also Damalinia; Eomenacanthus; Haematopinus.
LIGHT. Photoperiodicity in cattle; effect on coat in tropics, 1232; effect on broilers, 2696; photoreaction, 4084.
See also Eyes, diseases; Salmonella Infection, immunology; Thyroid Gland; Zootechny.
LIMNAEA. See Fasciola.
LINDANE (BENZENE HEXACHLORIDE). See Parasiticides, chlorinated hydrocarbons.
LINGUATULA. Diagnosis and treatment in dogs, 1093; pulmonary infestation in cattle, 2200; in the heart of cattle, 4013.
LINSEED. See Poisoning, plants.
LISTERIA. See Erysipelothrix (Listeria) Monocytogenes Infection.
LITOMOSOIDES. Immunity to L. carinii in cotton rats by transfer of developing worms, 3647.
LIVER.
General. Regeneration following partial hepatectomy, 602; bromsulphalein test in cattle, 866; 867; metabolism, in man, 884; control of haemorrhages from liver during biopsy in sheep, 1282; hepatic sphincters, 1597; ferritin synthesis in rat liver, 3760.
See also Copper; Growth, growth factors; Immunology, antibodies and antigens; Vitamins, vitamin A.
Bile. Alkaline phosphatase in billiary tract of sheep, 4117; glyceryl phosphoryl choline in pig bile, 4118.
See also Anaemia, Equine Infectious; Chlortetracycline; Fatigue; Phylloerythrin.
Diseases. Senecio and Crotalaria in aetiology of veno-occlusive disease, 566; 3004; veno-occlusive disease in rats from monocrotaline, 3005; hepatotoxic effect of Senecio alkaloids, 573; 574; aetiological relationship between polybacterial hepatitis and influenza in pigs, 767; differential diagnosis of focal nodular affections in pigs, 880; artifact resembling focal necrosis in ducks, 882; enzootic hepatitis in horses, 1189-1190; hepatocerebral disease of horses, 1191-1193; choline chloride treatment of liver dysfunction in cattle, 1883; bovine hepatic disease, 2264; 2265; effect of cirrhosis on adrenocortical function, 2993; diagnostic value of serum transaminase in hepatic and gastro-intestinal diseases, 3372; virus hepatitis in man and animals, 3976.
See also Anaemia, Equine Infectious; Abortion, Equine Virus; Encephalomyelitis, Equine, general; Hepatitis, Canine Virus; Mycobacterium Tuberculosis Infection, general; Neoplasms, general; causation; Parasiticides, toxicity; Poisoning; Psittacosis-Lymphogranuloma Group; Urinary System, urine.
Gall Bladder. See Fasciola; Neoplasms, in cattle.
LIVER FLUKE. See Fasciola.
LLAMAS. See Alpacas, Llamas and Vicuñas.
LOBELINE. See Skin, diseases.
LOUPING-ILL. See Encephalomyelitis, Ovine.
LUCERNE. Properties of lucerne and other saponins, 195.
See also Bloat; Sex Hormones, oestrogens; Vitamins, vitamin C.
LUCILIA. See Blowflies and Fleshflies; Parasiticides, chlorinated hydrocarbons.
LUNGWORMS. Aerosols for cattle, 167; in cattle in Canada, 488; 811; geographical distribution in Hungary, 815; in pigs in Yugoslavia, 817; in sheep and cattle in Slovakia, 1494; snails as intermediate hosts of sheep lungworms, 816; 1126; earthworms as intermediate hosts of pig lungworms, 818; epidemiology in calves, 1816; laboratory diagnosis, 2918.
See also Anafilaroides; Anthelmintics; Cystocaulus; Dictyocaulus; Metastrongylus; Muellerius; Respiratory System, diseases; Swine Fever, general; Vogeloides.
LUPINS. See Poisoning, plants.
LYMPHADENITIS, OVINE CASEOUS. See Corynebacterium Infection, sheep.
LYMPHANGITIS, EPIZOOTIC. See Histoplasma Farciminosum Infection.
LYMPHANGITIS, ULCERATIVE. See Corynebacterium Infection, horses.
LYMPHATIC SYSTEM. Lymphoid tissue in germ-free chicks, 1467; lymphocytic function, 3413; lymphatic capillaries in inflammation, 3893; 3894; abnormal lymphocytes, 4085.
See also Thymus.
LYMPHOSARCOMA. See Neoplasms, in dogs.
LYMPHOMATOSIS, VISCERAL. See Fowl Paralysis and Avian Leucosis Complex.
LYPEROSIA. See Siphona.
LYSINE. See Amino Acids; Calcium.

M

MACROZAMIA. See Poisoning, plants.
MADAGASCAR. See Carmyerius; Encephalomyelitis, Porcine.
MAGNESIUM. Aetiology of grass tetany, 3671; tetany-paresis syndrome in dairy cows, 2581; field investigations of hypomagnesaemia in cattle, 2244; Mg content of milk and hypomagnesaemia in calves, 1859; application to pasture for control of hypomagnesaemia in cattle, 1170; Effect of underfeeding after calving and of thyroprotein on serum Mg in cows, 202; blood content in calves fed on milk, 3324; Ca and Mg metabolism in calves, 1169; metabolism in dairy cattle, 524; requirement of weaned

MAGNESIUM—[cont'd.]
piglets, 1527; behaviour of dermal mast cells in deficient rats, 525; effect of deficiency on oxidative phosphorylation, 1528; estimation, 1858; Mg inactivation of antibiotics, 2305.
See also adrenal Gland, general; Calcium; Embryos, Mammalian, and Foetuses.
MAIZE. Mouldy maize as cause of encephalomalacia in solipeds in China, 2709.
MALARIA. See Plasmodium Infection.
MALATHION. See Parasiticides, phosphorus compounds.
MALAYA. See Helminth Parasites, General.
MALFORMATIONS. See Teratology.
MALLEOMYCES. See Pfeifferella.
MAMMARY GLAND. Book, mammary glands of farm animals, 594; bovine teat epithelium, 254; histopathology in cows, 1652; chronic oedema in cows, 3046; morphology of teats in cattle, 911; glandular tissue in teat canal in cattle, 2316; myoepithelium in the sow, 3409; histology and function in normal and agalactic sows,3742; particulate components in rats, 3743; effect of milk congestion and antibiotics on bact. content, 3477; secretion of proteins by the udder, 1913; incorporation of labelled cystine in milk proteins by the mammary gland, 1591; biochemistry of function, 910; strain differences in mice in response to hormones, 595.
See also Candida Infection, cattle; Circulatory System, general; Lactation; Mastitis; Mycobacterium Tuberculosis Infection, general; diagnosis; Neoplasms, general; in dogs; Salmonella Abortus-Ovis Infection; Viruses, General.
MAN, DISEASES OF ANIMALS TRANSMISSIBLE TO AND FROM. Advisory group on veterinary public helath, (WHO), 278; domestic animals and human diseases, 2261.
See also Brucella Infection, general; Brucella Melitensis Infection; Brucella Tularensis Infection; Dermatitis, Ovine Contagious Pustular; Encephalitis, Japanese B; Encephalomyelitis, Equine; Encephalomyelitis, Ovine; Helminth Parasites, General; Hygiene, food; Leptospira Infection, general; Microsporum Infection; Pneumonia, Porcine Virus; Pox Diseases, smallpox; Psittacosis; Respiratory System, diseases; Rickettsia Infection, Q fever; Rift Valley Fever; Ringworm; Stomatitis, Vesicular; Taenia; Trichophyton; Wesselsbron Virus.
MANGANESE. And utilization of iron in rabbits and lambs, 204; role of chlortetracycline and intestinal flora in requirement of niacin and manganese in chicks, 844; "head retraction" and deficiency in chicks, 854; blood clotting time and deficiency perosis in chicks, 1530; copper-molybdenum-sulphate-manganese relationship in, cattle, 3330; content of hair in cattle, 3331.
See also Embryos, Mammalian, and Foetuses; Nutrition, poultry.
MANGE.
General. Treatment in foxes with B.H.C., 474; control, 790; control of Myocoptes musculinus in mice by malathion, 1475; by Cnemidocoptes pilae in budgerigars, 1476.
Cattle. Treatment of sarcoptic mange in calves, 3619; decrease of chorioptic mites on pastured cattle in summer, 4006; skin diseases in Kenya and their effect on leather, 4067.
Dogs. Internal phase of demodectic mange, 156.
Sheep. Eradication in Krasnoyarsk, 1803; treatment of sarcoptic mange in pigs and calves, 3619.
MANURE. See Flies.
MASTITIS, BOVINE.
General. Importance of dry period in control, 4; vitamin B complex content in milk in Str. agalactiae mastitis, 650; pathology and bacteriology in relation to cell counts, 1651; immunological studies, 1653; distribution of bacteria in milk samples in a mastitis-controlled herd, 1995; predisposing factors and milking technique, 1996; progressive pathology, 1997; nutrition of cows and resistance of milk to Str. agalactiae, 1999; control by milking shed hygiene, with reference to hibitane, 2381; incidence in cows fed legume-grass mixtures, 3084; blood and milk proteins and protein-bound carbohydrates in mastitis, 3472; study in Denmark, 3473; due to CAMP positive alpha haemolytic group G streptococci, 3474; aetiology and pathogenesis, 3475; changes in milk, 3476; and mechanical milking, 3820.
See also Mammary Gland; Milk and Milk Products, hygiene.
Diagnosis. Eradication programme, 1386; rapid diagnosis, 2380; Whiteside and California tests, 2714; bact. counts and detection of herd mastitis, 3819.
Non-streptococcal. See Bacterium Aerogenes; Candida Infection; Escherichia Coli Infection; Leptospira Infection, cattle; Mastitis, Mycotic; Mycobacterium Tuberculosis Infection, general; diagnosis; Nocardia; Pasteurella Infection, cattle; Pseudomonas; Staphylococcus Infection, cattle.
Treatment. With diluted oxytetracycline, 3; West of Scotland Agric. College report, 957; i/m inj. of prednisone and penicillin, 973; use of proteolytic enzymes, 1303; tracer dye in antibiotic-containing intramammary injections, 1580; distribution of penicillin after intramammary inj., 1658; distribution of penicillin in goat udder, 1913; effect of penicillin and streptomycin on milk yield of non-clinical excretors, 3817; susceptibility of mammary streptococci to penicillin, 3818; antibiotic sensitivity tests, 3891; 3892.
See also Skin, diseases.
MASTITIS, CAPRINE. Aetiology, in West Bengal, 649.
See also Mammary Gland; Nocardia.
MASTITIS, MYCOTIC. By Cryptococcus neoformans, Saccharomyces, Hansenula, Pichia, Torulopsis and Candida, 717; nocardial, 1395; 2797; case report, 2078; treatment of Cryptococcus neoformans mastitis, 2792.
MASTITIS, OVINE. See Staphylococcus Infection; Streptococcus Infection.
MASTOCYTOMA. See Neoplasms, in dogs.
MEASLES (MORBILLI). Aetiological relationship with distemper, 444.
MEAT INSPECTION. See Hygiene, food.
MEAT MEAL. See Salmonella Infection, general.
MEGACOLON. Cause of death in lab. mice, 232.
"MEGASUL". See Nitrophenide.
MELANOMA. See Neoplasms, general; in rabbits.
MELIOIDOSIS. See Pfeifferella Whitmori Infection.
MELOPHAGUS. Transfer from ewes to lambs, 2199; control in sheep, 3610; 3611.
MENAPHTHONE ("MENADIONE") [SYNTHETIC VITAMIN K]. See Vitamins, vitamin K.
MENINGO-ENCEPHALITIS. See Encephalomyelitis; Poisoning, inorganic.
MEPACRINE. See Anthelmintics for sheep and goats.
MEPROBAMATE. Growth-inhibiting effect in cockerels, 575.
MERCURY. See Poisoning, inorganic.
MERTHIOLATE. See Agalactia, contagious, of Sheep and Goats; Swine Fever, virus.
"MESOTHELIOMA". See Neoplasms, in cattle.
METACHLORIDINE. See Plasmodium Infection.
METALDEHYDE. See Poisoning, therapeutics and agricultural chemicals.
METASTRONGYLUS. Infection of g.pigs with M. apri, 170.
METATARSUS. See Bones, general.
METHIONINE. See Amino Acids.
METHOXYCHLOR. See Parasiticides.
METHYLENE BLUE. See Vitamins, vitamin E.
METICORTEN [PREDNISONE]. See Mastitis, Bovine, treatment.
METRITIS. See Genital System, uterus.
MEXICO. See Anaemia, Equine Infectious; Rabies, general; immunology.
MICE. See Candida Albicans Infection; Corynebacterium Infection, general; Encephalomyelitis, Murine; Hepatitis, Mouse Virus; Heredity, general; Laboratory Animals; Mange, general; Megacolon; Microsporum Infection; Muscles; Nutrition and Metabolism, general; Pox Diseases, mouse pox; Ringworm; Syphacia; Temperature, environmental.
MICROCOCCUS. See Staphylococcus Infection.
MICROFILARIA. See Filaria.
MICROSCOPY. See Technique.
MICROSPORUM INFECTION. Isolation of M. distortum from animals in the U.S.A., 57; M. gypseum ringworm in horses, 1023; M. canis ringworm in man from cats, 1393; favus in mice, 1394.
See also Ringworm.
MICROWAVES. See Frost-Bite.
MIDDLEBROOK-DUBOS REACTION. See Erysipelothrix Rhusiopathiae Infection, immunology; Mycobacterium Tuberculosis Infection, diagnosis.
MILK AND MILK PRODUCTS.
General. Electron microscopical study of antileptospiral effect of milk, 376; reducing properties of milk, 1654-1657.
See also Brucella Infection, general; diagnosis; Lactation; Stomoxys.
Composition. Chemical composition and cell count, 1249; of ewes' colostrum and milk, 1844; cell count and solids-non-fat content of cows' milk, 1845; effect of pasture on vitamin A and carotene in cows' milk, 1868; prevention of bloat by whale oil, and effect on dairy products, 2228; seasonal changes in fatty acid composition of ewes' milk fat, 2570; acetylcholine in milk, 3024; microsomes in cows' milk, 3025.
See also Foot and Mouth Disease, general; Magnesium; Mammary Gland; Mastitis, Bovine, general; Thyroid Gland; Vitamins, vitamin B (complex).
Hygiene. Excretion of endrin by cows fed sprayed hay, 243; parasiticide residues in market milk, 274; S. manhattan in cows' milk, 356; effect of bacteria and fungi in bedding on milking hygiene, 395; pasteurization of milk containing R. burneti, 781; dermatitis from penicillin in milk, 2382; radio-caesium in dried milk, 2655; report of FAO/WHO Expert Committee on milk hygiene, 3427; endrin content in milk and tissues of cows, 4009.
See also Brucella Group; Brucella Infection, general;

MILK AND MILK PRODUCTS—Hygiene—[cont'd.]
Encephalitis, General; Erysipelothrix Monocytogenes Infection; Flies; Mastitis, Bovine, general; Mycobacterium Tuberculosis Infection, tuberculin test; Radiations; Staphylococcus Infection, general.
MILK FEVER. Calcium levels of blood and urine after inj. of calcium borogluconate, 216; aetiology, 543; prevention of relapses, 863; parathyroidectomy, 864; treatment, 1541; prophylaxis, 3695.
See also Calcium; Vitamins, vitamin D_2.
MILKING MACHINES. See Mastitis, Bovine, general.
MINERALS. See Haemonchus; Soil; Water; and under names of various minerals.
MINK. Poisoning and infectious diseases, 554; Aleutian disease, 2272.
See also Clostridium Botulinum Intoxication; Clostridium Infection, general; Mycobacterium Tuberculosis Infection, general; Pasteurella Infection; Toxoplasma Infection, general.
MITES. Infection of tapeworms and oribatid mites with Nosema helminthorum, 3558.
See also Cheyletiella; Cytoleichus; Mange; Tyroglyphus.
MIYAGAWANELLA. See Pneumonia, Caprine Virus; Psittacosis-Lymphogranuloma Group.
MOLES [TALPIDAE]. See Rabies, general.
MOLLUSCS. See Snails and Slugs.
MOLYBDENUM. Acetaldehyde oxidation in deficiency, 526; effect of dietary Cu and Mo in poults, 1532; soil and herbage factors associated with excess molybdenum and hypocuprosis in Irish cattle, 1861; a dietary essential for lambs, 3328; copper-molybdenum-sulphate-manganese relationship in cattle, 3330.
See also Copper; Neurospora; Nutrition, poultry; Poisoning, inorganic; Urinary System, calculi.
MONIEZIA. Anthelmintics, for sheep.
MONILIASIS. See Candida Infection.
MONKEYS AND APES. See Mycobacterium Tuberculosis Infection, treatment; Pneumonyssus; Prosthenorchis; Virus B; Vitamins, vitamin E.
MONOAMINASE. See Blood, composition.
MOOSE. See Brucella Infection, general.
MORPHINE. See Anaesthesia and Analgesia.
MOSQUITOES. See Encephalomyelitis, Equine; Myxomatosis; Parasiticides, phosphorus compounds, Taeniorhynchus; Wesselsbron Virus.
MOULDS. See Fungi, General; Poisoning, plants.
MOULTING. And thyroid and ovarian function, 1942.
MOUSE POX. See Pox Diseases.
MOUSE TYPHOID. See Salmonella Infection, general.
MUCOR. Activation of quiescent granuloma in rabbits by alloxan diabetes, 3896.
MUCOSAL DISEASE. Complex, 420; 1425-1427; West of Scotland Agric. College report, 957; British form, 2143; 2480; incidence and mortality in Iowa, 2850.
See aso Rinderpest.
MÜLLERIAN DUCTS. See Genital System, general.
MUELLERIUS. Development in lambs, 4030.
See also Anthelmintics, for sheep and goats.
MULES. See Horses, Donkeys and Mules.
MULTIPLE BIRTHS. Monozygotic twins and dairy cattle improvement, 2695.
MUMPS. See Newcastle Disease, general.
MUSCLES. Electrolyte levels in normal and dystrophic muscle determined by neutron activation, 531; paper electrophoresis of muscle fractions from vitamin E deficient rabbits, 535; myositis ("tying up") of race horses, 548; muscular dystrophy and myopathy-dyspnoea syndrome in calves, 870-877; animal myopathies, 1534; dystrophy in calves and lambs, 1535; multiple focal necrosis in cattle, 1546; muscular dystrophy in livestock in New Zealand, 2596; white muscle disease in calves and lambs, 2948; serum transaminase in white muscle disease, 2949; ineffectiveness of selenium in nutritional muscular dystrophy in rabbits, 2950; muscular dystrophy and fatal syncopy in pigs, 2983; muscle relaxants, 3018; 3019; metabolic and nutritional studies in mice with a hereditary myopathy, 3337; 3338; leiomyometaplasts in smooth muscle cells, 3364; histochemistry in human dystrophy, 3371; degeneration in lambs in Japan, 4068.
See also Blood, composition; Books, pathology; Cholinesterase; Circulatory System, vessels; Encephalomyelitis, Porcine; Immunology, antibodies and antigens; Myositis, Eosinophilic; Sarcosporidiosis; Scrapie; Swine Fever; Vitamins, vitamin E.
MYCOBACTERIA, GENERAL. Identification, 13; M. fortuitum, 14; mutation to proactinomyces by radiocobalt, 335; characterization of atypical mycobacteria and nocardia species, 339-340; pathogenesis of M. ulcerans infection in mice, 1324; simple method for maintaining stock cultures, 1672; multiplication of M. leprae-murium in cell culture, 2015; an organism resembling vole bacillus from a binturong (Actitis binturong), 2387; antigenic relationship in 98 mycobacteria by the gel-diffusion precipitation test, 2399; effect of medium on cultivation of M. balnei at 37°C., 2731; acid-fast organisms from Cape hydrax, 3099; from cold-blooded animals, 3100; isolation of phages, 3101; leucocytic transfer of delayed sensitivity to g.pigs from infected rats, 3485; multiplication of M. leprae-murium in tissue culture, 3835; immunological significance of the cell wall, 3836.
See also Mycobacterium Tuberculosis Infection, immunology.
MYCOBACTERIUM BALNEI. See Mycobacteria, General.
MYCOBACTERIUM FORTUITUM. See Mycobacteria, General.
MYCOBACTERIUM FRIEDMANNII. See Mycobacterium Tuberculosis Infection, immunology.
MYCOBACTERIUM JOHNEI INFECTION (JOHNE'S DISEASE). Vaccines for sheep, 337; cellular transfer of cutaneous hypersensitivity to avian tuberculin and johnin, 338; study of strains from farm animals, 1325; diagnosis by fluorescence microscopy, 1670; i/v inj. of graded doses of Johne's bacilli in sheep, 1671; sensitization of ox r.b.c. with johnin P.P.D. and tuberculin P.P.D., 2013; in cattle and sheep in New Zealand, 2014; c.f. test, 2732; foetal infection, 2733; in camels, 2734; 2735; exp., in rabbits, 2736; isolation from normal cattle, 3832; liquid medium, 3833; fate in mice and g.pigs, 3834.
MYCOBACTERIUM LEPRÆ MURIUM. See Mycobacteria, General.
MYCOBACTERIUM TUBERCULOSIS. Inhibitory action of blood on growth, 9; multiplication in vivo, 10; demonstration of small numbers in body fluids, 11; culture characteristics, drug and bacteriophage resistance of avian type, 333; mixed Br. abortus-M. tuberculosis cultures, 1352; pathogenicity of isoniazid-resistant bovine type, 2007; mycoid phase, 2723; differentiation of human bacilli from atypical acid-fast ones, 2729; extended incubation and propagability, 3095; differentiation of atypical acid-fast bacilli from avian type and other mycobacteria by the neotetrazolium inhibition test, 3096; influence of disinfectants on acid resistance in tubercle bacilli, 3097; delayed action of disinfectants, 3098; cultivation, 3481; 3482; use of voles for type differentiation, 3483.
MYCOBACTERIUM TUBERCULOSIS INFECTION.
General. Pathology in bovine reactors with no visible lesions, 7; localization of infection at the site of injury, 8; avian type bacilli as cause of abortion in cows, 327; healing of lung lesions in cattle, 328; in man, dog, and cat, 330; behaviour of phagocytes on exposure to tubercle bacilli, 334; disinfection with diamine, 336; mastitis, in India, 659; in meat of cattle with localized infection, 661; avian type in mink, 663; bovine type, in man, in Lyons, 975; in foxes, 976; reinfection of free herds, 1312; eradication in the U.S.A., 1313; in kangaroos, 1317; 2005; in geese, 1318; by droplet nuclei in g.pigs, 1319; oxygen tension in relation to virulence of bacilli and resistance to infection, 1323; eradication in farm animals in the U.S.S.R., 1666; bovine type in pigs, 1667; avian-type hepatic infection in pigs, 1668; role of Leydig cells in tuberculous and brucellar epididymitis and orchitis in pigs, 1723; in South Africa, 2002; in a horse by avian type bacilli, 2003; cats as carriers in cowsheds, 2386; simultaneous occurrence of different types and differential typing of mixtures, 2394; in horses by human-type bacilli, 2718; of the bone in a red lechwe, 2720; tubercle bacilli in uterus of infected cows, 3088; in pasteurized bottled milk, 3089; in a giraffe, 3091; primary inoculation TB. in monkeys, 3092; bovine, in mink, 3093; book, in animals and man, 3462; stimulation of epithelioid cell response in exp. g.pig TB., 3480; miliary, avian type, in a horse, 3822; control in cattle in Federal Germany, 3823; in milk in Poland, 3824; serum electrophoresis in cattle, 3826; disinfectants, 3830; inter-relationship between bovine farcy and TB., 3902.
See also Mycobacterium Tuberculosis Infection, tuberculin test.
Diagnosis (other than tuberculin test). Demonstration of small numbers of tubercle bacilli in body fluids, 11; chick embryo method, 332; Middlebrook-Dubos test in mammary TB., 660; X-ray diagnosis in dogs, 1315; fluorescence microscopy, 1670; by X-ray in monkeys, 2006; examination of sputum, 2392; whole blood agglutination in avian TB., 2398; "Dessau" antigen for haemagglutination test in bovine TB., 2721; paper electrophoresis of whey sampes from healthy and tuberculous cows, 2722; serological diagnosis in dogs, 2726; laboratory precautions in diagnosis, 3094; mouse test, 3821.
Immunology. Effect of isoniazid treatment on vaccination with B.C.G., 12; passive transfer of antibodies, 331; cross immunity between Br. melitensis and M. tuberculosis, 386; histology of lymph nodes in calves treated with killed vaccine, 662; effect of cellular constituents of mycobacteria on resistance, 978-979; book, immunization in man, 1287; tubercle bacillus wax as vaccine for mice, 1322; B.C.G. for cattle, 2008; immunity and circulatory antibody, 2009; in vivo neutralization of antibodies, 2010; role of thyroid in resistance, 2395; tissue culture studies on resistance and hypersensitivity, 2396; 2397; B.C.G. for cattle, 2724; diet and suscepti-

MYCOBACTERIUM TUBERCULOSIS INFECTION—
Immunology—[cont'd.]
bility of mice to B.C.G., **2725**; vaccination in calves, **3827**; M. friedmannii, strain 55-41, **3831**.
Treatment. Effect of isoniazid treatment on vaccination with B.C.G., **12**; in monkeys, **329**; **664**; phenazines (rimino compounds), **666**; use of infected HeLa cells for study of drugs, **667**; distribution of cycloserine in serum and organs of exp. animals, **1228**; early application of isoniazid to g.pigs, **1320**; agar media for rapid drug sensitivity tests, **1321**; persistence of organisms in treated g.pigs, **2393**; streptomycin and isoniazid for hypertrophic osteoarthropathy, associated with pulmonary TB. in dogs, **2727**; in calves with streptomycin, dihydrostreptomycin and a sulphone-isoniazid compound, **3090**; action of volatile oils from horseradish, **3484**; tuberculostatic agent from bovine spleen, **3828**.
See also Mycobacterium Tuberculosis.
Tuberculin and tuberculin test. Methods of inoculating cattle, **6**; testing of horses, **325-326**; cellular transfer of cutaneous hypersensitivity to avian tuberculin and johnin, **338**; i/v, in cattle, **657**; sensitivity in attested herds, **658**; acquired tolerance to tuberculoprotein, **665**; failure to transfer sensitivity passively, **977**; specificity of test in fascioliasis, **1314**; white blood picture in dogs as affected by tuberculin, **1316**; demonstration of hypersensitivity in vitro, **1669**; in free herds, **2004**; stability of P.P.D., **2011**; **2012**; sensitization of ox r.b.c. with johnin P.P.D. and tuberculin P.P.D., **2013**; standardization, **2388**; action of strychnine on ophthalmic reaction in cattle, **2389**; atypical reactions in cattle, **2390**; examination of milk from reactors, **2391**; an immunologically active tuberculopolysaccharide, **2400**; endotoxin-like effect of Old Tuberculin, **2728**; inhibition of hypersensitivity in g.pigs by inj. during foetal life, **3829**.
MYCOBACTERIUM ULCERANS. See Mycobacteria, General.
MYCOSES. See Books, mycology; Fungi, General.
MYCOSTATIN. See Candida Infection.
MYCOTIC BRONCHITIS. See Penicillium.
MYCOTIC DERMATITIS. See Actinomyces Dermatonomus Infection; Streptothricosis.
MYCOTIC MASTITIS. See Mastitis.
MYELOGRAPHY. See X-Rays.
MYELOMA. See Neoplasms, in cats; in dogs.
MYOCLONIA CONGENITA. See Trembling of Piglets.
MYOCOPTES. See Mange, general.
MYOSITIS. See Muscles.
MYOSITIS, EOSINOPHILIC. In Alsatians, **231**.
See also Sarcosporidiosis.
MYXOMATOSIS. Blood picture, **134**; transmission by Simulium melatum, **435**; comparative study of fibromatosis and myxomatosis by Ouchterlony's method, **771**; **2866**; transmission by mosquitoes in New South Wales, **1072**; propagation in g. pig sarcoma, **1436**; cultivation in tissues of non-susceptible hosts, **1437**; age and susceptibility of rats, **2167**; attenuated virus preservation in desiccated rabbit skins, **2492**; influence of amount of virus on course of exp. infection, **2493**; susceptibility of tissues to various strains, **2494**; transformation of fibroma into myxoma virus in tissue culture, **2867**; exp. study of neuromyxoma, **3243**; changes in resistance in Australian rabbits, **3593**.
MYXOVIRUS GROUP. See Newcastle Disease, virus; Viruses, General.

N

"NAGANOL" [SURAMIN]. See Trypanosoma Infection, treatment.
"NAIROBI SHEEP DISEASE". In Uganda, **2855**.
NECATOR. Study of hookworm larvae with P^{32}, **3631**.
NEGRI BODIES. See Rabies, general.
"NEGUVON". See Anthelmintics, for cattle.
"NEMADIS". See Anthelmintics, for sheep.
NEMATODES, GENERAL. Arthrobotrys species destroying larvae, **481**; two-day pasture rotation and nematode infestation in sheep, **1115**; recovery from quick-frozen cattle viscera, **1116**; exp. infection in pigs with nematodes of ruminants, **1122**; egg counts in rectal content of cattle, **1135**; in sheep on lowland farms, **2212**; inhibited development in cattle, **4027**; migration by infective larvae on forage plots, **4028**.
See also Anthelmintics.
NEMATODIASIS, CEREBROSPINAL. See Setaria.
NEMATODIRUS. Control in sheep, **1117**; in Northern Ireland, **1118**; N. filicollis in sheep, **2540**; N. battus in cattle, **2914**; preparasitic stages, **4029**.
See also Anthelmintics, for sheep.
NEOARSPHENAMINE. See Pox Diseases, goat pox.
NEOASCARIS. See Ascaris.
NEOMYCIN. See Circulatory System, vessels; Staphylococcus Infection, cattle.
NEOPLASMS.
General. Roller tube culture of Sticker's tumour, **179**; early detection of cancerous growth of skin, **181**; destruction of malignant rat tumour in vivo, **182**; a biological approach to cancer, **183**; biochemistry of chemotherapy, **184**; preputial carcinoma in domestic animals, **495**; melanoma in buffaloes, **834**; inhibitory effect of pineal body malignant tumours, **1141**; spontaneous, and induced by irradiation, in monkeys, **1498**; serum properdin levels and cancer cell homografts in man, **1499**; in animals, **1827**; pathological notes, **2216**; in the liver in mammals, **2217**; tumours characteristic for certain animal species, **2550**; relation of papilloma to cancer, **2551**; spontaneous mammary, **3293**; effect of pentacyclic triterpenes from the fungus Polyporus betulinus, **3294**; pulmonary adenomatosis in chinchilla, **3299**; spontaneous, in rats, **3300**; brain tumours, **3654**; X-ray therapy in small animals, **4043**.
See also Leucosis, Myxomatosis; Newcastle Disease, virus; Rabies, virus; Rhinotracheitis, Bovine Infectious.
Causation. Growth stimulation in liver and tumour development after i/p inj. of liver homogenates in rats, **1142**; spontaneous, and induced by irradiation, in monkeys, **1498**; non-toxicity of maleic hydrazide, **2220**.
See also Leucosis, bovine.
In cats. Reticulum cell myeloma, **180**; on the brain, **2924**.
In cattle. Preputial carcinoma, **495**; bladder carcinoma and chronic cystitis in a cow, **496**; relationship between eyelid pigmentation and "cancer eye", **497**; **1496**; neurofibromatosis in a cow, **835**; bladder tumours in cattle and buffaloes, associated with haematuria, **1139**; genetic aspects of "cancer eye", **2219**; carcinoma of horn and eye, **2548**; "mesothelioma", a congenital tumour in calves, **3295**; radon implants for treatment of squamous cell carcinoma, **3296**; "cancer eye", **3297**; **3649**; renal, in a cow, **3650**; epithelial tumours of the gall bladder, **4039**.
See also Leucosis.
In dogs. Testicular, **177**; sarcoma of vulva and vagina, **178**; preputial carcinoma, **495**; Sticker's sarcoma in Abyssinia, **498**; effect of Polyporus betulinus extract on Sticker's sarcoma, **1140**; primary splenic neoplasms, **1497**; mammary, **1828**; lymphosarcomatosis, **1829**; plasma cell myeloma, **1830**; of the brain, **2924**; **3653**; pathology and pharmacology of adrenal medullary tumour, **2925**; treatment of inoperable malignant tumours, **2926**; malignant lymphoma, simulating Hodgkin's disease, **2927**; i/m urotropine for papilloma, **3242**; carotid body tumour, **3298**; heart base tumours, **3651**; mastocytoma, **3652**; traumatic osteogenic sarcoma in man and dog, **3655**; Spirocerca lupi associated with oesophageal sarcoma, **4037**; haemangiopericytoma, **4040**; pancreatic islet cell carcinoma, **4041**.
See also Leucosis.
In horses. Preputial carcinoma, **495**.
See also Leucosis; Vitamins, vitamin E.
In poultry. Structure of virus particles associated with Rous sarcoma and presence in other neoplastic and normal fowl tissues, **500**; study of antiviral activity on Rous sarcoma virus, **2552**; Rous virus neutralizing antibodies, **3301**.
See also Fowl Paralysis and Avian Leucosis Complex.
In rabbits. Fluorescent antibody detection of Shope papilloma, **436**; primary meningeal melanoma, **499**; arthropod transmission of papilloma, **3970**; fibromatosis caused by Rous virus, **4042**.
See also Fibroma, Shope's; Myxomatosis.
In sheep. Thyroid fibrosarcoma in sheep given radioiodine, **176**.
See also Jaagziekte.
In swine. Haemangioendothelioma, **2549**; ovarian, in a sow, **3650**.
See also Leucosis.
"NEORICKETTSIA". See Psittacosis-Lymphogranuloma Group.
NEPHRITIS. See Kidneys.
NERVOUS SYSTEM.
General. Neurosecretory substance in the hypothalamic-hypophyseal system of the horse, **259**; sensory innervation of bovine skin and trunk, **261**; dorsal vagal motor nucleus in ruminants and non-ruminants, **262**; sweating and sympathetic innervation, **907**; neurosecretion, **1601**; course of efferent cardiac nerves in sheep, **1605**; nervous structure in goat proventricular epithelium, **1606**; influence of proserine on motor function of the digestive tract in sheep, **2284**; Nissl substance of spinal ganglion cells, ultraviolet absorption study, **2322**; effect of temp. on nerve regeneration, **2323**; functional innervation of the ovine heart, **3030**; biochemistry and morphology of myelination and demyelination, **3033**; splanchnic nerves and abdominal ganglia in horses, **3751**.
See also Digestive System, oesophagus; Rhinitis, Porcine Atrophic; Technique, staining.
Brain. Neurosecretory substance in the hypothalamic-hypophyseal system of the horse, **259**; cortical fibre system in dogs, **260**; in the horse, **267**; comparative anatomy in mammals, **1247**; disturbances in the formation of cerebellum, **1637**; oxytocin content of hypo-

NERVOUS SYSTEM -Brain—[cont'd.]
thalamus, **1922**; hypothalamic-hypophysial neurosecretory system of the cow, **3029**.
See also Behaviour of Animals; Genital System, oestrous cycle; Neoplasms, in cats; in dogs; Nervous System, diseases; Surgery, dogs; Taste; Vitamins, vitamin A.
Cerebrospinal fluid. Collection and normal values in dogs, **1200**.
See also Vitamins, vitamin A.
Diseases. "Neuronopathy" and "pseudolipidosis" in calves, **550**; paralysis of vagus branches as factor in "whistling" and "roaring" of horses, **869**; nervous syndromes in calves, **2977**; diseases of the c.n.s. in pigs, **2982**; focal necrosis of the bovine cerebral cortex, **2995**; comparative animal and human neuropathology, **3373**; aminonicotinamide and c.n.s. degeneration, **4096**.
See also Abortion, Ovine Virus; Aujeszky's Disease; Borna Disease; Chorea; Choriomeningitis, Lymphocytic Murine; Cysticercus; Encephalitis; Encephalomalacia, Avian; Encephalomyelitis; Epilepsy; Fusiformis Infection; Liver, diseases; Neoplasms, in cats; in cattle; in dogs; Nervous System, brain; Newcastle Disease, general; immunology; Psittacosis-Lymphogranuloma Group; Scrapie; Teratology; Trembling of Piglets; Viruses, General; "Visna".
Spinal cord. Topography and segmental structure in sheep, **4124**.
See also X-Rays.
NETHERLANDS. See Brucella Infection, general; Insemination, Artificial, cattle; goats; Reports.
NEUROFIBROMA. See Neoplasms, in cattle.
NEUROLYMPHOMATOSIS, AVIAN. See Fowl Paralysis and Avian Leucosis Complex.
NEUROMYXOMA. See Myxomatosis.
"NEURONOPATHY". See Cattle, diseases, general.
NEUROSPORA. Effect of Mo and Cu on enzymes in N. crassa, **1175**.
NEW-BORN ANIMALS. Physiology, **593**; excretion of urea, ammonia, and purine end products, **3754**; absorption of carbohydrates, **4054**.
See also Digestive System, general; Nutrition and Metabolism, carnivores; cattle; Potassium; Vitamins, vitamin A.
NEWCASTLE DISEASE.
General. In ostrich, vulture and toucan, **437**; human pathogenicity, and relation to mumps, fowl plague and influenza, **1443**; geese as latent carriers, **1785**; cerebellar lesions, **1787**; introduction by imported products, **2496**; transmission by and role of Ascaridia galli, **2873**; testing of disinfectants, **2874**; host range, **3247**; endocrine dysfunction, **3594**; in partridges, **3596**; control in Slovakia, **3972**.
Immunology. Combined Newcastle disease-fowl pox vaccine, **139**; **2498**; modification of Newcastle disease-infectious bronchitis vaccination programme in the U.S.A., **441**; modified live vaccine, **442**; immunization studies, **443**; periodate-treated virus as antigen for h.-i. test, **772**; oral vaccination, **773**; evaluation of adjuvant vaccines, **1075**; vaccine in drinking water, **1439**; **2168**; lesions in c.n.s. associated with Mukteswar vaccine, **1440**; aerosols and oral vaccines in Bulgaria, **2169**; interactions between virus, cell and antibody, **2170**; antibodies in human serum, **2171**; immunological properties of strains isolated from outbreaks, **2495**; practical control, **2479**; respiratory infection in chicks with mild (vaccine) virus, **3250**; drinking water vaccine and adsorbate vaccine, **3251**; action of Cl. welchii type C toxin on non-specific h.-i. of virus, **3971**.
See also Newcastle Disease, virus.
Virus. Characteristics of virus adapted to brain of new-born mice, **136**; effect of avirulent and virulent strain (Myxovirus multiforme) on cells in tissue culture, **137**; electron-microscopical study of macrophages infected with M. multiforme, **138**; demonstration by haemagglutination in the aqueous humour in fowls, **438**; homologous interference by ultraviolet-inactivated virus, **439**; multiplication in chick embryo tissue culture, **440**; electron microscopy of incomplete virus formation, **1076**; susceptibility of chicks to B-1 and infectious bronchitis virus, **1077**; cytopathogenicity in HeLa and bovine kidney tissue cells, **1441**; cytotoxic effect on ascites tumour cells, **1442**; multiplication in pig kidney tissue culture, **1456**; minimum of virus particles required to set up infection in chicks and embryos, **1786**; survival in nature, **2501**; radiation studies on infective property, **2502**; radiation study on haemolysin, **2503**; cultivation and transformation of fowl plague virus in HeLa cell explants, **2870**; virulence, **2872**; tissue culture modification, **3248**; effect of temp. on virus multiplication in embryonated eggs, **3249**; study by plaque method, **3595**.
See also Newcastle Disease, immunology.
NEW ZEALAND. See Books, diseases, general; Cobalt; Copper; Leptospira Infection, swine; Muscles; Mycobacterium Johnei Infection; Nutrition, in sheep; Ornithonyssus; Pneumonia, General; Poisoning, plants; Reports; Vaginitis, Bovine Virus.
NIACIN. See Vitamins, vitamin B (nicotinic acid).
NICARBAZIN. See Eggs, Hen; Eimeria Infection, treatment; Poisoning, therapeutics.
NICKEL. See Genital System, ovaries, ova and ovulation.
NICOTINIC ACID. See Vitamins.
ISO-**NICOTINIC ACID HYDRAZIDE.** See Mycobacterium Tuberculosis Infection, treatment.
NIGERIA. See Glossina; Reports; Rinderpest; Salmonella Infection, avian; cattle; swine; Streptothricosis, Cutaneous.
NIPPOSTRONGYLUS. In rats, **482**; method for counting, **809**; host specificity of N. muris, **3638**.
NITRATES. See Abortion; Poisoning, inorganic; plants.
NITRITES. See Poisoning, inorganic.
NITROFURANS. See Erysipelothrix (Listeria) Monocytogenes Infection; Sinusitis, Infection, of Turkeys.
NITROFURAZONE. See Eimeria Infection treatment and control; Poisoning, therapeutics; Salmonella Pullorum Infection, treatment; Trypanosoma Infection, treatment.
NITROGEN. Differences in content of chilled and non-chilled tissues, **2638**.
See Digestive System, ruminant digestion; Fatigue; Nutrition and Metabolism, sheep; swine.
p-NITROPHENOL. Determination in biological material, **749**.
NOCARDIA. Differentiation of atypical species, **339**; **340**; **2073**; isolated from bovine udder, **1395**; associated with cutaneous streptothricosis in cattle, **2796**; N. asteroides from cows with mastitis, **2797**; as cause of mastitis in a goat, **3175**; bovine farcy in Sudanese cattle, **3535**; biochemistry of Actinomycetales (Nocardia), **3536**; interrelationship of bovine farcy and TB., **3902**; effect of novobiocin and cycloserine, **3903**.
NOMENCLATURE AND CLASSIFICATION. See Bacteria, General; Coli-Aerogenes Group; Cystocaulus; Parasiticides, general; Salmonella Group.
NORTHERN FOWL MITE. See Ornithonyssus.
NORWAY. See Brucella Infection, cattle; Reports; Salmonella Infection, general.
NOSE. See Respiratory System.
NOSEMA. Exp. infection of tapeworms and oribatid mites with N. helminthorum, **3558**.
NOTOEDRES. See Mange.
NOVOBIOCIN. See Brucella Melitensis Infection; Nocardia; Streptococci, General.
NUCLEAR ENERGY. See Radiations.
NUCLEIC ACID. See Vitamins, vitamin A.
NUTRIA (MYOCASTOR COYPUS). See Salmonella Infection, general.
NUTRITION AND METABOLISM.
General. Feeding of lab. animals, **192**; addition of surface-active agents to diet of mice, hamsters and dogs, **193**; role of diet in g.pig production, **1836**; research problems in animal reproduction, **2686**.
See also Amino Acids; Books, nutrition; Calcium; Copper; Digestive System, ruminant digestion; Growth, growth factors; Muscles; Strontium; Technique, miscellaneous; Trace Elements; Vitamins; Water.
Antibiotic Supplements. See Antibiotics, General; Growth, growth factors.
Carnivora. Feeding of dogs and other carnivora, **190**; nutrition of cats, **191**; response of new-born puppy to water, salt and food, **2591**.
See also Nutrition and Metabolism, general.
Cattle. Effect of underfeeding after calving and thyroprotein dosing on serum Mg in cows, **202**; supplements on winter range, **1150**; fructose metabolism in dairy cows, **1516**; basal metabolism in new-born calves, **1833**; effect on coat shedding, **2225**; effects of air temp. and live wt. on water consumption in heifers, **2226**; malnutrition due to unbalanced diet of mesquite beans, **3312**.
See also Bloat; Colostrum; Digestive System, ruminant digestion; Glucose; Growth, growth factors; Joints; Magnesium; Mastitis, Bovine, general; Pastures and Grazing; Phosphorus; Teeth; Trace Elements; White Muscle Disease.
Horses. See Bones, diseases.
In relation to disease. Nutrition and atherosclerosis, **198**; emaciation in piglets, **1146**; palsy in tigers, **2240**; "wheat pasture poisoning", **2561**; enterocolitis in chinchilla fed chlortetracycline, **3315**; malnutrition and pathogenesis of disease, **4048**.
See also Amoeba; Ascaris; Ataxia; Bloat; Bones, diseases; Calcium; Cobalt; Copper; Diarrhoea, General; Encephalomalacia, Avian; Encephalomalacia, General; Encephalomyelitis, Porcine; Eyes, diseases; Fungi, General; Growth, growth factors; Hepatitis, Mouse Virus; Joints; Magnesium; Mastitis, Bovine, general; Muscles; Nutrition, fowls; sheep; swine; Parakeratosis; Pregnancy, general; Sterility, general; sheep; Surface-Active Agents; Thyroid Gland; Urinary System, calculi; Vitamins; White Muscle Disease; "Yellow Fat Disease".
Poultry. Weakness in chicks fed a diet supplemented with aluminium hydroxide gel, **516**; effect of access to

NUTRITION AND METABOLISM—Poultry—[cont'd.]
grass on breeding in hens, 840; value of grit for fowls and turkeys, 1147; sewage-grown algae for chicks, 1503; value of herbage, 1837; relationship of sulphate, Cu, Mn and Mo in chick diet, 2587; relationship of iodine and fluorine in chick diet, 3681.
See also Amino Acids; Cobalt; Copper; Eggs, Hen; Encephalomalacia, Avian; Growth, growth factors; Molybdenum; Phosphorus; Sodium Chloride; Vitamins, vitamin B (nicotinic acid); vitamin E; Water; Zinc.
Sheep. Purified diets for ruminants, 507; "unthriftiness" in weaners, 509; effect on thickness, weight and protein content of skin, 841; maintenance ration, 842; feeding of urea, 1149; metabolism in relation to circumstances and time of feeding, 1502; effect of feeding stilboestrol and urea on ration digestibility and Ca, P and N retention in lambs, 1512; ill-thrift in lambs in New Zealand, 2233; control of "bowie" in lambs, 2234; metabolic disorders associated with movement of hill sheep, 2247; requirements, 3305; renal changes in response to nitrogen metabolism in sheep, 3318; hogget ill-thrift, 3658; effect of fluorine on fattening of lambs, 4059.
See also Ataxia; Blood, general; Bones, diseases; Cobalt; Digestive System, ruminant digestion; Growth, growth factors; Lucerne; Molybdenum; Phosphorus; Sodium Chloride; Sterility; Trichostrongylus; Wool.
Swine. Book, 315; utilization of carbohydrates, 1517; protein malnutrition, 1519; protein content of diet and nitrogen digestibility, 1520; copper sulphate levels in rations for growing pigs, 1526; problems in baby piglets, 1835; effect of some antibiotics on palatability of swine rations, 3314.
See also Bones, general; Encephalomyelitis, Porcine; Growth, growth factors; Magnesium; Nutrition and Metabolism, in relation to disease; Phosphorus; Potassium; Water; "Yellow Fat Disease".
NUTTALIA. Piroplasmosis in horses in Macedonia, 1751.
NYASALAND. See Helminth Parasites, General; Reports.
NYMPHOMANIA. See Genital System, ovaries.

O

OAK (QUERCUS). See Poisoning, plants.
OBSTETRICS. See Parturition.
OEDEMA DISEASE OF PIGS. Prophylaxis and treatment with sulphamethazine-sulphamerazine, 226; presence of haemolytic E. coli, 350; pathology in 16 pigs, 553; recent work, 1885; in piglets, 2269; E. coli serotypes associated with oedema disease, 2742; 3359.
OEDEMA, MAMMARY. See Mammary Gland.
OEDEMA, PULMONARY. See Respiratory System, diseases.
OESOPHAGOSTOMUM. O. venulosum in cattle in Australia, 3634.
OESOPHAGUS. See Digestive System.
OESTRADIOL BENZOATE. See Sex Hormones, oestrogens.
OESTRADIOLCYCLOPENTYLPROPIONATE (ECP). See Sex Hormones, oestrogens.
OESTRIDAE.
Dermatobia. Systemic control of D. hominis in cattle with Dow ET-57, 1802.
Gasterophilus. Piperazine-carbon disulphide complex, 1798; polymeric piperazine carbodithioic acid, for Gasterophilus intestinalis and G. nasalis in horses, 2194.
Hypoderma. H. bovis infestation in horses, 150; Dow ET-57 against warbles, 152-154; 1470-1472; 1800; 2196; 3268; 3996; control of warbles with DDT/BHC, 1090; external treatment of larvae in cattle, 151; use of "chlorophos" against warbles, 470; control of warbles, 1090; killing migrating larvae, 1091; ineffectiveness of phenothiazine and stilboestrol in steers, 1799; effect of hypotonic and hypertonic NaCl on first instar larvae, 2195; warble control in the U.S.S.R., 2898; 2899; 2900; control by Bayer 21/199, 3997.
Oestrus. Control in sheep with Dow ET-57, 2197.
OESTROGENS. See Sex Hormones.
OESTROUS CYCLE. See Genital System.
OFFICE INTERNATIONAL DES EPIZOOTIES (OIE). See Encephalomyelitis, Equine.
OLEANDER (NERIUM OLEANDER). See Poisoning, plants.
OLEANDOMYCIN. Mode of action, 3391.
See also Growth, growth factors; Leptospira Infection, general; Streptococci, General.
OMASUM. See Digestive System, ruminant digestion.
"OMNADIN". Effect on resistance of body, 3388.
ONCHOCERCA. Aortic, in cattle in Ghana, with O. armillata, 828; acute cutaneous infestation in cattle, 3645; O. armillata in Sudanese cattle 4038.
OPHTHALMIA, EQUINE PERIODIC. Environmental factors, 1543; clinical and legal aspects, 1544.
OPOSSUM (DIDELPHYS). See Leptospira Infection, general.
ORCHITIS. See Brucella Infection, swine; Genital System, testicles; Mycobacterium Tuberculosis Infection, general.
ORF. See Dermatitis, Ovine Contagious Pustular.
ORIBATID MITES. See Mites.
ORNITHODOROS. See Ticks, Argasidae.
ORNITHOFILARIA. See Filaria.
ORNITHONYSSUS. Malathion control, 791; 3277; O. sylviarum in New Zealand, 3276.
ORNITHOSIS. See Psittacosis.
OSTEOCHONDROSIS. See Bones, diseases.
OSTEODYSTROPHY. See Bones, diseases; Vitamins, vitamin C.
OSTEOGENESIS IMPERFECTA. See Bones, diseases.
OSTEOMALACIA. See Bones, diseases.
OSTEOMYELITIS. See Bones, diseases.
OSTEOPOROSIS. See Bones, diseases.
OSTERTAGIA. Chronic diarrhoea in cattle due to parasitic gastritis, 483.
OSTRICHES. See Newcastle Disease, general.
OTOBIUS. See Ticks, Argasidae.
OUCHTERLONY GEL DIFFUSION TECHNIQUE. See Immunology, precipitation.
OVA, OVARIES AND OVULATION. See Genital System.
OXIDASE. Activity in sera of different species, 1923.
OXYGEN. See Embryos, Mammalian, and Foetuses; Mycobacterium Tuberculosis Infection, general; Pneumonia, General; Trypanosoma Equiperdum Infection.
OXYTETRACYCLINE. Antibiotic inhibitors: milk constituents and selected divalent cations, 1581.
See also Anaplasma Infection; Brucella Infection, treatment; Circulatory System, vessels; Corynebacterium Infection, horses; Digestive System, ruminant digestion; Escherichia Coli; Foot Rot; Hygiene, food; Leptospira Infection, swine; Mastitis, Bovine, treatment; Pasteurella Infection, cattle; Pseudomonas; Salmonella Pullorum Infection; Tetracyclines.
OXYTOCIN. See Lactation; Nervous System, brain.

P

PAKISTAN. See Babesia Infection, general; Escherichia Coli Infection, avian; Stephanofilaria; Trichuris.
PANCREAS. Histology in pigs in relation to age and constitution, 257; collection of pancreatic juice from sheep, 1540; pancreatic and salivary amylase in baby pigs, 2313.
See also Digestive System, general; Neoplasms, in dogs; Trypsin.
PANLEUKOPENIA, FELINE. See Enteritis, Feline.
PANTOTHENIC ACID. See Vitamins.
PAPILLOMA. See Neoplasms, in dogs; in rabbits.
PARA-AMINO SALICYLIC ACID (P.A.S.). See Growth, growth factors.
PARACOLOBACTRUM AEROGENOIDES. Isolation from chicks, 24.
PARAFFIN. See Digestive System, ruminant digestion.
PARAKEETS. See Bones, diseases; Mange, general.
PARAKERATOSIS. In pigs, 1171; zinc treatment in pigs, 527; role of calcium and zinc in pigs, 564; 2579.
PARAMPHISTOMUM. From domestic animals in Bihar, 2205; P. spinicephalus from rumen of buffalo, 2534.
PARA-OXON. See Parasiticides, phosphorus compounds.
PARAPLEGIA & PARALYSIS. See Abscesses; Blood, composition; Escherichia Coli Infection, cattle; Nervous System, diseases; Nutrition, in relation to disease; Vitamins, vitamin E.
PARASITIC INFESTATION, GENERAL. Recent trends in parasite physiology, 786; treatment and prophylaxis of parasitic diseases, 2215; studies on animal parasites, 3993.
See also Books; Technique and Apparatus, parasitological.
PARASITICIDES.
General. Potential acaricides, 155; metabolism of L13/59 in the cow, 473; effect of urine and faeces on activity of blowfly larvicides, 789; control of ectoparasites in sheep, 1097; E. stramineus control, 3267; insecticide resistance, 1098; British Standard recommended common names for pesticides, 1222; contamination of broilers with chlordane and pyrethrum, 1574; book, pest control research, 1647; residues in market milk, 274; control of fleas, 2522; control of parasites on clover and accumulation of insecticide in pig tissue, 3387; recommendations by the Entomology Research Division, 3616; acaricides and insecticides for poultry, 4012.
See also Damalinia; Hygiene, food; Lice; Melophagus; Oestridae, Hypoderma; Siphona; Ticks, Ixodidae.
Chlorinated hydrocarbons. Tolerance of cattle to inj. of gamma BHC, 472; treatment of mange in foxes with BHC, 474; toxicity of gamma BHC for fowls, 787-788; determination of the gamma isomer in dips, 3273; 4008; lindane taint in eggs, 2299; DDT metabolites in rat bile, 1573; DDT resistance of B. microplus, 2528; eradication of Glossina morsitans with DDT, 3271; DDT for control

PARASITICIDES—Chlorinated hydrocarbons—[cont'd.]
of G. palpalis fuscipes, 3618; DDT dips against cattle ticks, 4004; systemic aldrin against Damalinia ovis, 1086; movement of dieldrin in the sheep's fleece, 1087; persistence of aldrin and dieldrin in fleece, 3615; insecticides against body strike in sheep, 1088-1089; dieldrin resistance of Lucilia cuprina, 2523; endrin in milk and body tissues, 243; 4009; 4010; contamination of broilers with chlordane and pyrethrum, 1574.
See also Parasiticides, toxicity.
Dips and dipping. See Parasiticides, chlorinated hydrocarbons; Ticks, Ixodidae.
Phosphorus compounds. Toxicity of phosphorus insecticides, 1221; destruction of organophosphate insecticides by rumen fluid, 1477; organophosphorus insecticides, 2901; Dow ET-57 against warbles, 152-154; 1470-1472; 1800; 2196; 3268; 3996; systemic Dow ET-57 against Dermatobia hominis in cattle, 1802; Dow ET-57 for control of fly larvae in manure, 1473 Dow ET-57 against O. ovis in sheep, 2197; ET-57 against fly strike in sheep, 3269; toxicity of Dow ET-57 in cattle and sheep, 154; determination of parathion, para-oxon, and p-nitrophenol in biological material, 794; 2626; toxicity of parathion, malathion, E.P.N., and diazinon, 242; metabolism and excretion of diazinon in cows, 1572; diazinon poisoning in ducks, 897; serum protein changes in dogs fed parathion, 1910; 2298; malathion against Haematopinus suis, 3994; carbamoyl alkyl phosphorodithioates tested by the mouse-mosquito test, 3272; diagnostic test for poisoning in cattle, 3385; control of Eomenacanthus stramineus, 3267; toxicity of "wofatox" for cattle and pigs, 3386; fate of Bayer 21/199 in rats, 3620; Bayer 21/199 against warbles, 3997.
See also Mange, general; Ornithonyssus.
Repellents. Against hornflies, 1092; against stable flies, 1801; butoxy polypropylene glycol, methoxychlor and methylated naphthalenes for control of biting flies in cattle, 3270.
Toxicity. Toxicity of chlordane, BHC, toxaphene, DDT and strobane, 242; of chlorinated hydrocarbons and organic phosphorus compounds, 242; 1221; toxicity of dieldrin seed dressing for game birds, 565; of chlorten aerosols for animals, 1911; liver lesions in rats after administration of insecticides, 2300; liver lesions in rats fed chlorinated hydrocarbons, 2625.
See also Parasiticides, chlorinated hydrocarbons, phosphorus compounds; Poisoning, therapeutics and agricultural chemicals.
PARATHION. See Parasiticides, phosphorus compounds.
PARATHYROID GLANDS. Factors influencing function, 885; effect of parathyroidectomy in calves, 921; interrelationship of cortisone and parathyroid extract, 3422; differentiation of equine, canine, bovine, ovine and caprine glands, 4125; 4126.
See also Calcium; Milk Fever.
PARATUBERCULOSIS. See Mycobacterium Johnei Infection.
PARATYPHOID. See Salmonella Infection.
PARESIS, PARTURIENT. See Milk Fever.
PAROTID GLANDS. See Salivary Glands.
"PARSIDOL". See Chorea.
PARTHENOGENESIS. See Embryos, Fowl.
PARTRIDGES. See Anthelmintics, for poultry; Newcastle Disease.
PARTURITION. Book, veterinary obstetrics, 317; vaginal temp. before and after calving, 1262; bovine obstetrics and "ring womb' in ewes, 1264; bovine dystokia, 3180; in Thoroughbreds, 3779; puerperal sepsis and toxaemia in sows, 3784; labour in rabbits, 2673.
See also Blood, composition; Pregnancy; Sex Hormones, progesterone; Surgery.
PASTEURELLA HAEMOLYTICA. See Pasteurella Infection, in cattle; in sheep.
PASTEURELLA INFECTION.
General. Antibiotic treatment of infection in mice, 1683; pulmonary abscesses in rats, 2406; production of dense culture, 3494; biophysical characteristics of P. septica, 3850; biochemistry of strains from different hosts, 3851; antigenic analysis of P. multocida, 1684; failure of agglutination test to identify types of P. septica, 3849; isolation of P. septica from man, 3852.
Avian (fowl cholera). Chick embryo vaccine, 672; sulphadimidine treatment, 673; effect of sulphaquinoxaline and chloramphenicol in fowl cholera in turkeys, 674; in ducklings, 984.
See also Pasteurella Infection, immunology.
Cattle. P. haemolytica-P. septica bacterin for the control of shipping fever in Canada, 345; airborne transmission of infectious bronchitis, 346; causing encephalitis, 671; viral agent in shipping fever complex, 1332; pathology, 1333; aetiology, pathogenesis and epidemiology, 1681; control by terramycin feeding, 1682; epidemiology of shipping fever, 2024; stress factors in shipping fever, 3848.
See also Pasteurella Infection, immunology.
Fur-bearing animals. In mink, 20; 3109.
Horses. Haemorrhagic septicaemia, 1680.
Immunology. Past. septica polysaccharide for protection of fowls and mice, 21; immunizing value of extracts of P. septica, 2025; value of penicillin-lysed cultures of P. septica, 2026; production of haemorrhagic septicaemia vaccine, 3108; immunizing complex from P. pestis, 3495.
Sheep. Enzootic pneumonia, associated with P. haemolytica, 1548; 2267; 3356.
PASTEURELLA PSEUDOTUBERCULOSIS INFECTION. Pseudotuberculosis in chinchilla, 2740.
"PASTEURELLA PSEUDOTULARENSIS". See Brucella Tularensis Infection.
PASTEURELLA SEPTICA. See Pasteurella Infection, general; cattle; immunology.
PASTEURIZATION. See Milk and Milk Products, hygiene.
PASTURES AND GRAZING. Influence of high production pasture on animal health, 1831.
See also Behaviour of Animals; Copper; Dictyocaulus; Digestive System, ruminant digestion; Fertility, fowls; Helminth Parasites, General; Magnesium; Milk and Milk Products, composition; Nematodes, General; Poisoning, plants; Radiations; Sex Hormones, oestrogens.
PATHOLOGY. See Books.
PAVETTA HARBORII. See Poisoning, plants.
"PECUDIN" [DICHLORACETYL PHENYLSEMICARBAZIDE]. See Brucella Infection, treatment.
PELVIS. See Pregnancy, general.
PENDULOUS CROP IN TURKEYS. See Digestive System, general.
PENICILLAMINE. See Poisoning, inorganic.
PENICILLIN. Inducing bacterial lysis, 716; parenteral benzathine penicillin V in cattle, 902; action on thiamine metabolism, 903; action on absorption of radiolysine by chicks, 2574; oral penicillin V and injectable procaine penicillin, 3012.
See also Bloat; Corynebacterium Infection, cattle; Digestive System, fauna and flora; Growth, growth factors; Leptospira Infection, general; cattle; L Forms of bacteria; Mammary Gland; Mastitis, Bovine, treatment; Poisoning, therapeutics, Skin, diseases; Staphylococcus Infection, general; cattle.
PENICILLINASE. Toxicity, 4102.
PENICILLIUM. P. penicilloides from a horse with mycotic bronchitis, 3528.
PENIS. See Genital System.
"PENJAKIT INGUSAN". In cattle and buffaloes in Indonesia, 2144.
PENTACHLOROPHENOL. See Poisoning.
PENTAMIDINE. Antifungal activity, 393.
PENTOBARBITONE. See Anaesthesia and Analgesia, general.
PENTOSE. See Glucose.
PEPSIN. In baby pigs, 2312.
PEROSIS. See Manganese; Vitamins, vitamin B (folic acid).
PERSIA. See Clostridium Welchii Infection; Spirochaeta Infection.
PERU. See Alpacas, Llamas and Vicuñas.
PFEIFFERELLA MALLEI INFECTION (GLANDERS). Diagnostic tests, 2404; an intracellular substance enhancing mortality from Pf. mallei, 3487.
PFEIFFERELLA WHITMORI INFECTION (MELIOIDOSIS). Pathogenesis and immunity in mice and hamsters, 2016; epidemiology and prophylaxis, 3837.
PHAGOCYTES. See Blood, corpuscles (white).
PHALARIS. See Poisoning, plants.
PHARMACOLOGY. Pharmacological action of some organic solvents, 1578; protective inhibition in chemotherapy, 3006; harmful side-effects of therapeutics, 3009; pathogenetic therapy, 3729.
See also Books; Enzymes, General; Viruses, General.
PHEASANTS. See Anthelmintics, for poultry; Capillaria; Cytoleichus; Encephalomyelitis, Equine; Erysipelothrix Rhusiopathiae Infection, avian; Syngamus; Vibrios, General.
PHENOTHIAZINE. Dosage, 896.
See also Anthelmintics; Oestridae, Hypoderma.
PHENYLBUTAZONE. In the therapy of various equine diseases, 3017.
PHOSPHATASE. See Bones, diseases; Digestive System, general.
PHOSPHATES. Effect of phosphate supplements on weight in cattle, 1095; ruminant utilization of inorganic phosphates, 1523; enzymic synthesis of lactose 1-phosphate, 1588; effect of phosphate fertilizers on animal body, 2954.
See also Blood, composition.
PHOSPHORUS. Dicalcium phosphate and phosphoric acid for cattle, 3672; requirements of calves, 3673; utilization of phytin phosphorus by sheep, 3674; availability for pigs, 3675.
See also Bones, general; Calcium; Embryos, Mammalian, and Foetuses; Haematuria, Bovine Chronic; Isotopes, Radioactive; Nutrition and Metabolism, sheep; Parasiticides, phosphorus compounds; Sex Hormones, oestrogens; Thyroid Gland; Trichostrongylus; Zinc.

PHOTOPERIODICITY. See Light.
PHOTOSENSITIZATION. See Poisoning, general; plants; Skin, diseases.
PHYLLOERYTHRIN. Occurrence and determination in bile and blood, **1905**; **1906**.
PHYSOCEPHALUS. P. sexalatus in fowls, ducks and geese, **1492**.
PICHIA. See Mastitis, Mycotic.
PIGEONS. See Anthelmintics, for poultry; Digestive System, general; Eimeria Infection, avian; Histoplasma Capsulatum Infection; Poisoning, therapeutics; Pox Diseases, pigeon pox.
PIGMENTS. See Amino Acids; Blood, haemoglobin; Growth, growth factors; Liver, bile; Neoplasms, in cattle; Pineal Body; Reports, Netherlands.
PIGS. See Swine.
PINEAL BODY. Comparative morphology, **266**; inhibitory effect on malignant tumours, **1141**; melanin pigmentation and gonadal function, in cattle, **2650**.
"PINK TOOTH". See Porphyria.
PIPERAZINE COMPOUNDS. See Anthelmintics; Oestridae, Gasterophilus.
PIROPLASMOSIS. See Babesia Infection.
PITUITARY GLAND. Antagonism between FSH and rat pituitary gonadotrophin, **1958**; effect of stalk section in goats, **3421**.
See also Mammary Gland; Nervous System, brain; Prolactin; Sex Hormones.
PITYRIASIS. See Skin, diseases.
PLACENTA. See Genital System.
PLASMODIUM INFECTION (MALARIA). Effect of splenectomy on malaria in ducks, **80**; resistance of Pl. gallinaceum to chloroquine diphosphate, **737**; a new malarial parasite pathogenic for fowls, **2809**; resistance of Pl. gallinaceum to metachloridine, **3928**.
PLEURO-PNEUMONIA, BOVINE CONTAGIOUS. C.f. test, **58**; avianized vaccine, **59**; immunization with dried organism and adjuvant, **60**; antigenic structure, **61**; dead vaccine, **1026**; chemotherapy, **1027**; in Angola, **2084**; in Australia, **2447**; serological relationship with vaccinia, **2449**; **3904**.
PLEURO-PNEUMONIA, CAPRINE CONTAGIOUS. Drying of causal agent, **1396**; laboratory diagnosis, **2450**.
See also Pleuro-Pneumonia Group.
PLEURO-PNEUMONIA GROUP. Susceptibility to antibiotics, **1398**; canine PPLO, **1737**; conversion of PPLO to bacteria, **1739**; pathogenicity of organisms from goats for swine, **2085**; drug sensitivity, **2451**; as cause of disease in rats, **1397**; sulphonamide treatment in rats, **3178**; direct enumeration, **3185**; stability to physical factors, **3186**; lyophilization, **3187**; strain differences in PPLO of avian origin, **394**; **3906**; causing encephalitis in turkeys, **723**; respiratory diseases of poultry, **2087**; **3179-83**; testing poultry for infection, **1738**; antigenic analysis of strains and pathogenicity for fowls, **3540**.
See also Sinusitis, Infectious, of Turkeys; Synovitis, Infectious, of Fowls.
PLEURO-PNEUMONIA, OVINE CONTAGIOUS. In sheep, **1305**.
PNEUMONIA, CAPRINE VIRUS. Faecal excretion of Miyagawanella, **427**; infection of lab. animals with Nagano strain, **764**.
PNEUMONIA, GENERAL. Virus pneumonia in rats, **135**; enzootic, in sheep in New Zealand, **1546**; **2267**; **3356**; aetiological relationship between gastroenteritis and pneumonia in pigs, **1195**; oxyhaemometric studies in exp. and spontaneous pneumonia, **1558**; intra-oral inoculation technique in mice, **2785**; **2786**; enzootic, in calves in Canada, **2972**; viral pneumonia-enteritis in calves, **761**; pneumonia in cattle, **2973**.
See also Haemophilus Infection; Influenza, swine; Respiratory System, diseases.
PNEUMONIA, PORCINE VIRUS. In Kenya, **128**; demonstration of antibodies by the h.-i. test, **1783**; chick embryo culture, **2160**; immunity, **3966**; due to Coxsackie virus and transmission to man, **3967**.
PNEUMONITIS, FELINE. Resistance of virus to dimethyl quinoxaline dioxide, **3969**.
PNEUMONYSSUS. P. foxi infection in monkeys, **1806**.
PNEUMOTHORAX. See Respiratory System, lungs.
POISONING.
General. Poisoning in mink, **554**; oil field problems for the veterinarian, **1210**; photosensitization in cattle probably from aphids, **2623**; toxicity of calf meal contaminated with B. cereus and B. megatherium, **3378**; a probably toxic disorder in fowls, **3379**.
See also Books, toxicology.
Inorganic. With lead arsenate in cattle, **563**; iron granules in macrophages in lead poisoning, **1208**; with lead in dogs, **2287**; lead detection in bovine blood and liver, **2619**; lead poisoning in fowls, **2620**; calcium edetate and BAL for treatment of lead poisoning in cattle, **1562**; calcium disodium versenate treatment of lead poisoning in a bull, **3000**; lead uptake by r.b.c. in vitro, **3717**; lead-reactive substances in myoneural synapses, **4087**; effect of dietary NaF on cows, **1559**; **2996**; lipid material in bone and teeth in chronic fluorosis, **1207**; effect of water fluoridation on chick growth, **1507**; serum alkaline phosphatase in cows on high fluoride diet, **2288**; with NaCl poisoning, in pigs, **888**; **2292**; with NaCl in poults, **1897**; with NaCl in livestock, **1561**; with NaCl, and protective effect of KCl, **2293**; by nitrite, in sheep, **889**; nitrate poisoning in cattle, **1212**; **1213**; **3374**; Maintenance of milk cows in selenium-affected areas, **236**; with selenium dioxide in dogs, **2289**; effect of choline deficiency on selenium poisoning in rats, **237**; metabolism of selenite modified by arsenite, **2290**; by zinc phosphide in birds, **887**; treatment of metal poisoning with penicillamine, **1209**; arsenic and potatoes, **1560**; Cu supplements as cause of jaundice in housed sheep, **2998**; mercuric chloride causing nephrosis and hepatic lesions, **2291**; Mo poisoning in cattle on pumice land and control by inj. of Cu, **2997**; molybdenum toxicity for rats, **4088**.
See also Eyes, diseases; Parasiticides, toxicity; Poisoning, therapeutics and agricultural chemicals.
Organic. Hyperkeratosis from chlorinated naphthalenes, in cattle, **890**; in cattle with chlorinated naphthaline-impregnated binder twine, **1564**; effect of chlorinated naphthalenes on turkeys, **3376**; isolation of strychnine and other alkaloids from animal tissues, **1900**; Haematology of cattle given trichlorethylene-extracted soya meal, **238**; aplastic anaemia in fowls fed trichlorethylene extracted soya meal, **570**; effect of trichlorethylene-extracted meat scrap on cattle, **4089**.
See also Parasiticides, chlorinated hydrocarbons; toxicity; Venoms.
Plants. Toxicity of Phalaris tuberosa for sheep and cattle, **239**; Phalaris staggers in sheep, **1216**; in cattle with Gutierreza microcephala, **241**; excessive consumption of grapes by cows, **510**; toxic action of Aristolochia clematitis on horse kidney, **567**; toxicity of Pavetta harborii, **893**; in cattle by plants containing nitrates, **1213**; Leucaena glauca causing hair loss in livestock, **1214**; weeds containing nitrates as cause of abortion in cattle, **1215**; **1902**; with lupin, in sheep, **1217**; toxicity of Macrozamia leaves for cattle, **1219**; photosensitization in cattle, sheep and pigs, **1220**; oak leaf poisoning in cattle, **1567**; **3725**; effect of hypoglycin A and B from ackee tree (Blighia sapida), **1569**; action of hypoglycin-A, **3727**; toxicity of leguminous plants in French West Africa, **1570**; scilliroside intoxication in rats, **1571**; pastures producing facial eczema in sheep in New Zealand, **1903**; **1904**; facial eczema in sheep associated with Stemphylium botryosum, **4094**; toxicity of heliotrine and lasiocarpine for rats, **2294**; with linseed in cattle, **2622**; toxic encephalomalacia in solipeds in China from mouldy maize, **2790**; effect of gossypol in young chicks, **3003**; with oleander, in cattle, **3380**; in cattle with chestnut leaves, **3381**; toxicity of Indigofera edecaphylla for rabbits, **3382**; Claviceps paspalum poisoning in cattle, **3386**; ergot and ergot-like fungi as cause of vesicular dermatitis (sod disease) in fowls, **3722**; losses in Western U.S.A., **3723**; with bracken, in cattle, **3726**; lab. diagnosis of Hypericum perforatum poisoning, **4093**; Senecio and Crotalaria in veno-occlusive disease of liver, **566**; **3004**; veno-occlusive disease in rats by inj. of monocrotaline, **3005**; "grass staggers" (senecio) in horses in Basutoland, **240**; chronic liver changes after dose of lasiocarpine, a Senecio alkaloid, **573**; hepatotoxicity and pharmacology of heliotrine, a Senecio alkaloid, **574**; Senecio erraticus and Zdár disease in horses, **1193**; **3724**; Senecio longilobus causing hepatic cirrhosis in sheep, **1568**; lathyrism, **1218**; **1901**; teratogenic effect of lathyrus factor in chicks, **892**; lathyrus factor causing aortic rupture in poults, **2295**.
See also Nutrition, in relation to disease; Poisoning, organic therapeutics; Saponins.
Therapeutics and agricultural chemicals. Toxicity of dieldrin seed dressing for game birds, **565**; beta-amino propionitrile and sulphaquinoxaline as cause of avian haemorrhagic syndrome, **569**; **1907**; hepatotoxic and pharmocological properties of heliotrine, **574**; streptomycin, **579**; **580**; **3384**; toxicity of nicarbazin for chicks, **581**; toxicity of tetramethylthiuram disulphide for poultry, **891**; toxicity of nitrofurazone for chicks, **894**; by disinfectants in chicks, **1211**; with toxic chemicals used on farms, **1563**; response of liver to CCl_4 poisoning, **1565**; **1566**; **2627**; action of ethylene dibromide on gonadotrophins in hens, **1898**; warfarin poisoning in domestic animals, **1899**; reversal of sulphaguanidine toxicity, **1908**; heavy mortality in sheep from parenteral diethylamine acetarsol, **2621**; toxicity of certain antibiotics and furazolidone for chick embryos, **2624**; effect of glycerine on toxicity of isoniazid-streptomycin mixtures in mice, **2629**; with iron dextran in unweaned piglets, **2999**; bone marrow studies in pigs given chlorinated naphthalene and CCl_4, **3002**; possible harmful side-effects of therapeutics, **3009**; severe reaction to antibiotics, **4103**; toxicity of wood preservatives containing sodium arsenate, fluorate and bichromate, **3001**; in cattle with wood preservatives, **3375**; toxicity of penicillin G and dihydrostreptomycin sulphate for fowls and pigeons, **3384**; arsenico-phenol poisoning in cattle,

POISONING—Therapeutics and agricultural chemicals—[cont'd.]
3718; plasma inhibition by toxic phosphorus compounds, 3719; metabolism of chlorinated naphthalenes, 3720; determination of pentachlorophenol, 4090; with carbamide in ruminants, 4091; toxicity of metaldehyde for birds, 4092.
See also Anthelmintics; Formaldehyde; Parasiticides, toxicity; Penicillinase; Sex Hormones, oestrogens.
POLAND. See Brucella Infection, general; swine; Mycobacterium Tuberculosis Infection, general; Rabies, immunology; Vibrio Suis Infection.
POLIOMYELITIS. Chlorination of virus, 775; comparative study of avian neurolymphomatosis and poliomyelitis, 2930; cytopathogenic effect of virus, 3979.
POLIOMYELITIS, MOUSE. See Encephalomyelitis, Murine.
"POLYBOR-3". See Anthelmintics, general.
POLYGONUM CUSPIDATUM. See Sex Hormones, gonadotrophins.
POLYMORPHUS. P. minutes in ducks, 3646.
POLYMYXIN. See Pseudomonas; Staphylococcus Infection, cattle.
POLYPHENYLOXYDASE. See Blood, composition.
POLYPORUS BETULINUS. See Neoplasms, general; in dogs.
POLYTHIONATE. See Skin, diseases; Urinary System, urine.
POLYVINYLPYRROLIDONE. See Technique and Apparatus, staining.
POLYVINYL CHLORIDE. See Silage.
PORCUPINES (ATHERURUS). See Babesia Infection, general.
PORPHYRIA. Congenital, in British cattle, 2364; congenital porphyria in cattle in Michigan, 3059; porphyrin esters from bovine porphyria urine, 2654.
PORPHYRINS. Antiviral action, 1792.
See also Urinary System, urine.
POSTHITIS. See Genital System, prepuce.
POTASSIUM and POTASSIUM COMPOUNDS. Na: K ratio in saliva of sheep, 529; electrolytes against calf scours, acidosis, and K deficiency, 547; renal lesions in K deficiency, 1862; response of new-born piglets to excess, 2592; histochemistry of kidney from potassium-deficient rats, 2957; adsorption and excretion in pigs, 3332; metabolism of caesium and potassium in pigs, 4060.
See also Blood, composition; Eggs, Hen; Fatigue; Growth, growth factors; Ketosis; Poisoning, inorganic; Trichostrongylus.
POTERIOSTOMUM. See Horses, Donkeys and Mules, helminth parasites.
POULTRY. See Ducks; Fowls; Geese; Pigeons; Turkeys.
POX DISEASES.
General. Inoculation of chorioallantoic membrane to decrease non-specific lesions, 93; spread in tissues, 1048; short description of the group, 1420; characteristics of vaccinia, cow pox and rabbit pox virus strains, 3575.
Buffalo pox. Generalized, 3220.
Canary pox. Virus multiplication and lesions in chick embryos, 756.
Cow pox and vaccinia. Antigenic relationship with bovine contagious pleuro-pneumonia, 2449; 3904; relationship between swine pox and vaccinia demonstrated by gel diffusion, 2470; liberation of cell-bound vaccinia virus by ultrasonic vibration, 2835; genetic studies with vaccinia virus strains, 3572.
Fowl pox. Combined Newcastle disease-fowl pox vaccine, 139; 2498; vaccines for turkeys, 1046; 3947; chick embryo vaccine, 1047; antibiotic treatment, 3166; pigeon pox vaccine, 3573; 3574; electron microscopy, 3948.
See also Pox Diseases, general.
Goat pox. Neoarsphenamine treatment, 415.
Mouse pox (Ectromelia). Vaccination, 92; in chick embryos, 1045; control, 2836.
Pigeon pox. Storage life, 2837; for vaccination against fowl pox, 2573; 2574; electron microscopy, 3948.
Sheep pox. Pathology, 1043; cultivation in chick embryos, 1044; effect on culture of ovine testicular cells, 3946.
Swine pox. In Kenya, 128; immunological relationship with vaccinia, 2470.
PRECIPITATION. See Immunology.
PREDNISONE AND PREDNISOLONE. Use in veterinary medicine, 583.
See also Ketosis; Mastitis, Bovine, treatment; Skin, diseases.
PREGNANCY.
General. Conferences on gestation, 316; 4167; effect of defective nutrition during pregnancy in farm animals, 1834; prolonged gestation in Jersey cows, 1272; prolonged gestation in Ayrshire herd, 1963; pregnancy disease in cows, 1634; reproduction in worm-free sheep, 1825; treatment and metabolic pathways in pregnancy disease in ewes, 2606; gestational changes in ovine connective tissue, 2672; intracervical steel springs for preventing pregnancy in cows, 2685; effect of furazolidone, 937; relaxation of pubic symphysis in mice, 263; effect of ultrasonic waves on embryonic development and pregnancy in rabbits, 3054; oral contraceptive for rats, 4152.
See also Anaemia, General; Blood, composition; Embryos; Escherichia Coli Infection, general; Fertility; Genital System; Iron; Leptospira Infection, cattle; Parturition; Sex; Sex Hormones; Sterility; Vitamins, vitamin B (folic acid).
Diagnosis. In cattle, 936; 3048; sources of error in cows, 1263; from bovine cervical mucus, 1619; chromogens in pregnant cows' urine, 2675; early diagnosis in goats and ewes 3049; oestrogens in urine and faeces of pregnant cows, 3441.
PRIMIDONE. See Epilepsy.
PROACTINOMYCES. See Mycobacteria, General.
PROCAINE. See Anaesthesia and Analgesia, general.
PROGESTERONE. See Sex Hormones.
PROLACTIN. Molecular weight of ovine pituitary lactogenic hormone, 1920.
PROLAPSE. See Genital System, vagina.
PROMAZINE HYDROCHLORIDE. A clinical note, 3731.
PROPERDIN. Isolation from human plasma, 2188.
See also Immunology, general; Neoplasms, general.
PROPIONATE. Inhibition of acetate metabolism by propionate, 3426.
PROSERINE. See Nervous System, general.
PROSTATE GLAND. See Genital System.
PROSTHENORCHIS. P. elegans infestation in marmosets, 2213.
PROTEINS. Role of radioiodine labelled proteins in biology and medicine, 562; protein turnover studied by doubly labelled plasma proteins in dogs, 3424.
See also Amino Acids; Blood, composition; corpuscles [red]; Ketosis; Nutrition and Metabolism; Urinary System, urine.
PROTHIDIUM. See Trypanosoma Infection, treatment.
PROTHROMBIN. See Blood, coagulation.
PROTOANEMONIN. See Histoplasma Farciminosum Infection.
PROTOZOA, GENERAL. See Books, protozoology; Technique and Apparatus, parasitological.
"PSEUDOLIPIDOSIS". See Cattle, diseases, general.
PSEUDOMONAS. P. pyocyanea isolated from cetrimide, 22; as cause of chronic mastitis and infantile enteritis, 675; bactericidal effect of polymyxin B and oxytetracycline, 2407; from bull semen, 3853.
PSEUDOTUBERCULOSIS. See Pasteurella Pseudotuberculosis Infection.
PSITTACOSIS. Intradermal test in turkeys, 1448; in wild and cage birds in Japan, 1449; chlortetracycline treatment in turkeys, 1791; in gulls, 1881; virus and antigen study, 2173; c.f. tests and agglutination test with turkey serum, 2174; passive haemagglutination reaction, 2505; ineffectiveness of furazolidone as prophylactic for turkeys, 2506; ducks as reservoir of human infection, 3255; preparation of c.f. antigen, 3974; simultaneous salmonellosis and ornithosis in ducks and geese, 4062.
See also Bacterium Anitratum.
PSITTACOSIS-LYMPHOGRANULOMA GROUP. Miyagawanella isolated from faeces of goats with virus pneumonia, 427; infection in a dog, 1080; multiplication in deembryonated eggs, 1081; electron microscopy, 1453; a virus pathogenic for goats, 2175; rickettsial phase of viruses, 3256; "neorickettsia" in rabbits, 1450; 1451; 1452; isolation of "neorickettsia" from I. ricinus, 3257; isolation of Miyagawanella virus from sheep faeces, 3975.
See also Abortion, Ovine Virus.
PUBERTY. See Temperature, environmental.
PUBLIC HEALTH. See Hygiene; Man, Diseases of Animals Transmissible To and From; Milk and Milk Products; Radiations.
PULLET DISEASE. Demonstration of virus in turkeys, 143.
PULLORUM DISEASE. See Salmonella Pullorum Infection.
PURINES. See New-born Animals.
PYELONEPHRITIS. See Corynebacterium Infection, cattle.
PYOMETRA. See Genital System.
PYRALDIN. See Babesia Infection, dogs; Trypanosoma Infection, treatment.
PYRETHRUM. See Parasiticides, general.
PYRIDINE DERIVATIVES. As growth factors, for ducklings, 212.
PYRIMETHAMINE. See Eimeria Infection, treatment; Toxoplasma Infection, general.

Q

Q FEVER. See Rickettsia Infection.
QUINAPYRAMINE ("ANTRYCIDE"). See Trypanosoma Infection, treatment.
QUININE. See Genital System, uterus.

R

RABBITS. Avian predation on young rabbits, 607; fluctuations in populations in Western Australia, 1254.
See also Anaemia, General; Arthropod Parasites, General; Ascaris; Brucella Infection, general; Cheyletiella; Dysplasia, Hip; Hyostrongylus; Neoplasms; Pox Diseases, general; Trichostrongylus; Trypanosoma Infection, general; Vermin Control.

RABIES.
General. WHO Expert Committee, third report, 755; behaviour of infected mice and voles, 89; in pigs in Kenya, 128; in Tunisia, 3569; in bats and moles in Yugoslavia, 412; reaction of North African hedgehogs to Flury strain, 413; "dikovaniya" in foxes, 434; Arctic foxes as carriers, 753; control of wild-life vectors in Mexico-U.S.A. border, 1416; report on conference at Kharkov, 1417; pathogenesis in bats, 1768; staining Negri bodies, 91; development of Negri bodies in brain tissue culture, 2468; local wound treatment, 2832; advances in treatment, 2833; bats and paralytic rabies in cattle in French Guiana, 3217; autosterilization and recovery, 3570; diagnosis, 3943.
Immunology. Antibody formation in vaccinated dogs, 88; mass immunization of dogs, 754; avianized vaccine, 2467; proteinaemia in sheep following use of avianized vaccine, 1771; Finnish vaccine, 1772; vaccination in Poland, 2128; aluminium hydroxide adsorbed vaccine, 2129; Mexican avianized vaccine against bovine paralytic form, 3571; interference of immune serum with vaccine antigenicity in mice, 2469; effect of proteolytic enzymes on antigenicity, 1769; 1770; prophylaxis in man, 414; soluble antigen in infant mouse brain, 90; neutralizing antibodies, 3945; fluorescent antibody staining, 3944; specific precipitation in agar gel, 3219; c.f. test, 1415; 2831; 3219.
Virus. Cultivation in mouse tumour cells, 1418; 1419; influence of antibiotics and acidity on virus, 2834; culture in hamster kidney, 3942.

RADIATIONS. Windscale accident, 3428; radiation and health, 1205; acute irradiation sickness in farm animals, 3368; radio-iodine in sheep before and after nuclear reactor accident, 3709; metabolism of fission products in ruminants, 3369; effect of gamma irradiation on blood Cu and Mg in asses, 4073; spleen lesions in pigs exposed to local gamma irradiation, 4077; biological effects of radio-iodine in pigs, 4075; survival studies in pigs exposed to gamma neutrons, 4076; effect of beta irradiation on rabbit, sheep and pig skin, 2991; function of calf adrenal cortex following exposure to gamma radiation, 2279; 4074; radioactivity in animal thyroids, 1892; plutonium metabolism in adult dogs, 4079; alpha ray activities of man and his environment, 3370; radiostrontium in soil, grass, milk and bone in the U.K., 4082; Sr and Sr-90 in food and bones, 3334; 3335; 3336; radio-caesium in dried milk, 2655; late pathology of Sr-90 in rat bones, 4080; effect of radiostrontium on skeletal formation, 1896; waste disposal, 1204; strontium-calcium movement from soil to man, 1203; biological hazards from strontium-90, 883; deposition of yttrium, cerium and thulium in bones, 4083; feeding rats with gamma-irradiated food, 4044; treatment of post-radiation infections in mice, 3710; gastric lesions after irradiation, 2992; effect on pigmentation in mice, 2637; effect of chronic gamma radiation on blood in g.pigs, 2280; shortening of life span in exp. animals, 1895; effect of thermal neutrons on life span in mice, 1893; 1894; implantation of spleen in irradiated young mice, 1466; bacteriology of irradiated mice, 387; 2616.
See also Blood composition; Disinfectants, Embryos; Hygiene, food; Leucosis, in swine; Neoplasms, causation; Sterility, general; Tyroglyphus.

RADIOGRAPHY AND RADIOLOGY. Gamma radiography in vet. practice, 560; pathological effects of thorium dioxide in canine myelography, 2985; radiodermatitis in horses, 1891; danger of X-rays, 2282; radiological hazards in veterinarians, 2281.
See also Kidneys; Mycobacterium Tuberculosis Infection, diagnosis.

RANUNCULUS. See Leucosis, bovine.

RATS. See Brucella Infection, general; Capillaria; Haemophilus Infection; Myxomatosis; Nippostrongylus; Pleuropneumonia Group; Pneumonia, General; Ringworm; Tail.

REGURGITATION. See Digestive System, ruminant digestion.

REINDEER. A meat producing animal, 1968.

RELAXIN. See Genital System, uterus; Pregnancy, general.

REPELLENTS. See Parasiticides.

REPORTS.
Australia. Northern Territory Administration, Animal Industry Branch (1955, 1956 and 1957), 1980; Queensland, Department of Agriculture and Stock (1956, 1957), 1981; South Australian Institute of Medical and Veterinary Science (1956, 1957), 1982; New South Wales, Livestock Health and Animal Husbandry (1954, 1955), 1983; New South Wales, Institute of Stock Inspectors (1957), 1984; C.S.I.R.O. (1955-56), 2372.
Belgian Congo. Veterinary Laboratory, Elisabethville (1956), 3461.
Belgium. Committee for control of sterility (1956), 1631.
Canada. Veterinary Director General (1956), 1644.
Cyprus. Chief Veterinary Officer (1956), 3070.
Czechoslovakia. State Veterinary Institute, Bratislava (1956), 1646.
East Africa. East African Trypanosomiasis Research Organization (1955-56), 727; East African Virus Research Institute (1955-56), 763.
Gambia. Dept. of Veterinary Services (1954-55), 3805.
Honduras, British. Agricultural Dept. (1955), 642.
International. FAO report to the Government of India on production of virus vaccines, 144; FAO Second Near East meeting on animal health (1956), 222; WHO Expert Committee on rabies (1957), 755; Joint FAO/WHO Expert Committee on Milk Hygiene, 3427; FAO report to the Government of the Federation of Rhodesia and Nyasaland on control of parasitic diseases of livestock, 3621; FAO report to the Government of the Federation of Rhodesia and Nyasaland on infectious sterility in cattle, 4150.
Jamaica. Department of Agriculture (1955), 3071.
Kenya. Department of Veterinary Services, 1985; 2703.
See also Reports, East Africa.
Netherlands. Artificial insemination, (1955-56), 281-282; Director of Veterinary Service (1954-55), 643; Health Service for Carrier Pigeons (1956-57), 2374; Health Service for Livestock in Friesland, 2705; Provincial Health Service for Animals, South Holland (1956-57), 3806; Agriculture in 1956, 3807.
New Zealand. Director-General of Agriculture (1957), 3069; Animal Research Division, Dept. of Agriculture, (1956-57), 3459.
Nigeria. Veterinary Dept. Northern Region (1954/55), 1645.
Norway. Veterinary Service (1953-55), 1284; 1285; 3073.
Nyasaland. Dept. of Veterinary Services and Animal Industry (1956), 3460.
See also Reports, international.
Tanganyika. Veterinary Department, Research and Statistics (1955), 3072.
Trinidad and Tobago. Agriculture Department, 2704.
Uganda Protectorate. Department of Veterinary Services and Animal Industry (1955), 2373.
United Kingdom. West of Scotland Agricultural College (1956), 957; Royal Veterinary College (1955/56), 1643; Medical Research Council (1955/56), 2702; Agricultural Research Institute, Hillsborough, (1956-57), 3067; Agricultural statistics of Northern Ireland (1930-1953), 3068; Animal Health Services, Great Britain (1956), 3458; Agricultural and Food Statistics, 3804.
U.S.A. Los Angeles County Livestock Department (1956-57), 3074; Montana Livestock Sanitary Board (1956-57), 3075.

RESEARCH INSTITUTES AND ORGANIZATIONS. Golden jubilee of Coonoor Pasteur Institute, 279; East African Veterinary Research Organization, 926; index of agricultural research institutions in Europe, 1642.

RESERPINE (SERPASIL). Effect on fowls, 4099.
See also Circulatory System, heart; Lactation.

RESPIRATORY SYSTEM.
General. Respiratory rate in buffaloes, 1917; respiration in cattle, 3417; histochemistry of pulmonary hyaline membranes in cattle, 551; effect of chlortetracycline on respiratory exchange in rats, 3665; air pathway in the avian lung, 258; the vomero-nasal organ in horse and ox, 4122.
See also Diaphragm.
Diseases. Muscular dystrophy and myopathy-dyspnoea syndrome in calves, 870-877; pneumotropic viruses in man and pigs, 1049; respiratory diseases of sheep, 1548; pulmonary lesions in mice due to fragments of injected hair, epidermis, etc., 2614; bronchopneumonia in pigs, 1196; spontaneous inflammatory bronchiectasis in rats, 2988; symposium on respiratory diseases in poultry, 3179; 3180; 3181; 3182; 3183; Penicillium penicilloides as cause of bronchitis in a horse, 3528; aetiology and treatment of laryngeal stenosis in horses, 3698; clover seeds as cause of pulmonary oedema in cattle, 3699.
See also Bacillus Anthracis Infection; Bronchitis, Avian Infectious; Cytoleichus; Echinococcus; Epidemic Cough; Influenza; Jaagziekte; Laryngo-Tracheitis, Avian Infectious; Linguatula; Mycobacterium Tuberculosis Infection, general; Neoplasms, general; Pasteurella Infection, general; Pleuropneumonia, Bovine Contagious; Pneumonia, General; Pneumonitis, Feline; Pneumonyssus; Psittacosis-Lymphogranuloma Group; Rhinitis, Porcine Atrophic; Rhino-Tonsillitis, Canine Contagious; Rhinotracheitis, Bovine Infectious.

RESTRAINT OF ANIMALS. See Temperature, environmental.

RETICULITIS, TRAUMATIC. See Foreign Body Syndrome.
RETICULO-ENDOTHELIAL SYSTEM. See Immunology, general.
RHINITIS, PORCINE ATROPHIC. Occurrence and aetiology, **1197**; in Roumania, **2268**; rhinitis associated with trichomonads, **1744**; dystrophy of turbinate bones in young pigs, **856**; lesions in the nervous system, **3703**.
RHINO-TONSILLITIS, CANINE CONTAGIOUS. In France, **133**.
RHINOTRACHEITIS, BOVINE INFECTIOUS. General accounts, **112**; **422**; immunological studies, **114**; vaccine, **760**; **1428**; **2851**; symposium on mucosal disease complex, **1425**; virus modification in tissue culture and preparation of vaccine, **1778**; propagation of virus in human cancer cells, **113**; intranuclear inclusions in infected tissue culture, **1779**; propagation in porcine kidney tissue, **3227**.
RHIPICEPHALUS. See Ticks, Ixodidae.
RHODESIA. See Helminth Parasites, General; Reports, International; Sweating and Sweat Glands.
RIBOFLAVIN. See Vitamins.
RIBONUCLEASE. See Immunology, general.
RIBONUCLEIC ACID. See Encephalomyelitis, Equine; Viruses, General.
RICKETS. See Bones, diseases; Vitamins, vitamin A.
RICKETTSIA INFECTION.
General. From ticks and rodents in Kenya, **456**; rickettsial conjunctivitis in cattle, **1794**; effect of cortisone on murine typhus in lab. animals, **2177**; **2178**; **2179**; viruses and rickettsia of mammals, **3602**; R. canis in Hyderabad, **2513**; aureomycin treatment of rickettsia infection in dogs, **2886**.
See also Psittacosis-Lymphogranuloma Group; Technique, viruses and rickettsia.
Heartwater. Immunization of goats, **145**; a disease of goats in Dalmatia resembling heartwater, **1083**.
Q fever. In the U.S.S.R., **449-452**; experimental infection in Hyalomma plumbeum, **453**; survival in preserved meat, **454**; protective or neutralizing antibody, **455**; allergic test in sheep, **1084**; Q fever antibodies in ovine serum, **2263**; experimental infection in fowls, **2512**; wildlife carriers, **3981**.
See also Milk and Milk Products, hygiene.
RIFT VALLEY FEVER. A variant, **1061**; persistence of antibodies in man, **1062**; a veterinary and medical problem, **2147**.
RINDERPEST. Meeting on control in Cambodia, Laos, Thailand and Vietnam, **758**; spread by meat, **3587**; immunity in calves, **3957**; cross immunity between distemper and rinderpest, **1454**; immunization in Japan, **2846**; **2847**; **3588**; **3589**; immunization in Northern Nigeria, **110**; modified virus vaccines, **2479**; lapinized virus, **1056**; **1777**; **2845**; **2849**; **3226**; use of lapinized vaccine in the Belgian Congo, **2845**; lapinized-avianized virus, **3588**, **3589**; avianized vaccine, **111**; **2140**; freeze-dried goat-adapted vaccine, **759**; caprinized vaccine, **2848**; c.f. test, **2477**; **2478**; neutralization tests, **109**; **3958**.
RING TEST. See Brucella Infection, diagnosis.
RINGWORM. In man and animals in Scotland, **391**; in wild animals in Georgia, **392**; physical factors in dermatomycoses, **1024**; in laboratory mice and rats, **2081**; treatment in cattle, **2795**; selective epilation in treatment of tinea capitis, **3534**.
See also Microsporum Infection; Trichophyton.
RIVANOL. See Anaplasma Infection.
"ROARING". See Nervous System, diseases; Respiratory System, diseases.
RODENTS. See Brucella Infection, general; Brucella Tularensis Infection; Eimeria Infection; Hepatozoon; Leptospira Infection; Pasteurella Infection; Pasteurella Pseudotuberculosis Infection; Spirochaeta Infection; Rickettsia Infection; Salmonella Infection, general; Toxoplasma Infection; Vermin Control.
ROUMANIA. See Brucella Infection; Rhinitis, Porcine Atrophic; Thelazia.
ROUND HEART DISEASE. A survey, **555**.
ROUS SARCOMA. See Neoplasms, in poultry; in rabbits.
RUBARTH'S DISEASE. See Hepatitis, Canine Virus.
RUMINANT DIGESTION. See Digestive System.

S

SACCHAROMYCES. See Mastitis, Mycotic.
SALIVARY GLANDS. Salivary reflexes in sheep, **906**; **1598**; in camels, **916**; effect of parasympathetic stimulants on secretion in fowls, **1239**; secretion and function in ruminants, **1934**; parotid weight in sheep with permanent unilateral fistula, **1935**; pancreatic and salivary amylase in baby pigs, **2313**; examination of bovine serum and saliva for blood group substances, **2520**; salivary secretion, and rumen extension, **4046**; quantitative determination of secretion, **4114**; modified salivary cannulas for large animals, **4158**.
SALMONELLA ABORTUS-OVIS INFECTION. Occurrence in male and female genitalia and udder of sheep, **2746**.
SALMONELLA ARIZONA. See Salmonella Group.
SALMONELLA BAREILLY. See Salmonella Infection, avian.
SALMONELLA BINZA. See Salmonella Infection, avian.
SALMONELLA BOVIS-MORBIFICANS. See Salmonella Infection, in cattle; in horses.
SALMONELLA BREDENEY. See Salmonella Infection, avian.
SALMONELLA DUBLIN. See Salmonella Infection, sheep and goats.
SALMONELLA ENTERITIDIS. See Salmonella Infection, general.
SALMONELLA GALLINARUM INFECTION (FOWL TYPHOID). Live vaccines, **32-33**; stimulation of lymph gland lesions by adrenocortical extracts, **1690**; ascorbic acid content of plasma in fowl typhoid, **2410**; effect of dietary protein levels on susceptibility of chicks, **2411**; in Great Britain, **3126**; effect of vitamins on susceptibility, **3127**; properties of Spanish strains, **3128**.
SALMONELLA GROUP. Enterobacteriaceae Subcommittee list of serotypes, **3498**; types isolated in Uganda, **3115**; types identified at Ghent, **34**; types isolated in Berlin, **357**; **686**; **687**; serotypes in Surinam, **3116**; in imported pig food, **1345**; isolation from animal feeding stuffs, **2745**; **3120**; differentiation of Arizona group, **986**; keratin hydrolysate as source of amino acids in media, **987**; growth, **989**; variability of lysotypes, **1694**; new serotype of Arizona group, **2032**; a new type, S. hamilton, **2748**; lipids and induced chloramphenicol resistance, **2750**; media for isolating salmonella from food samples, **3121**.
SALMONELLA HAMILTON. See Salmonella Group.
SALMONELLA HEIDELBERG. See Salmonella Infection, avian.
SALMONELLA INFANTIS. See Salmonella Infection, avian.
SALMONELLA INFECTION.
General. Conjunctival infection of g.pigs with S. typhimurium and S. enteritidis, **27**; experimental mouse typhoid, **28 29**; survivors of infection as carriers of mouse typhoid, **358**; latent infection in slaughter animals in Norway, **1341**; strains isolated from meat in Thuringia, **1342**; in animals in Aruba, **1343**; from animals and animal products in Sweden, **1344**; **3119**; in nutria with S. typhi, **2033**; S. lexington from fowls causing enteritis in man, **2035**; contamination of egg products, **2036**; heat treatment of feeding stuffs, **2037**; new phage type of S. paratyphi B causing food poisoning, **2409**; effect of light on serum samples from rabbits injected with S. typhi-murium antigen, **1689**; bactericidal activity of normal serum, **2751**.
Avian. In Danish poultry, **1691**; salmonella in fowls in Ibadan, **1339**; incidence and control in England and Wales, **2747**; S. gallinarum, S. pullorum, S. typhimurium, S. binza, S. montevideo, S. bredeney, S. panama, S. bareilly and S. infantis isolated from poultry, **359-360**; S. typhi-murium infection in fowls, **3858**; furazolidone treatment of S. typhi-murium infection in fowls, **689**; indirect haemagglutination with S. typhi-murium, **1349**; S. heidelberg as problem in pullorum control, **1346**; with strains other than S. pullorum and gallinarum, **1347**; S. saint-paul in chicks, **1348**; S. bareilly in chicks, **690**; exp. infection of chicks with various salmonella, **1692**; infection of eggs from fowls infected with various salmonella, **3859**; salmonella in faeces of ducks, turkeys, geese and fowls, **30**; in ducks and geese, **4062**; S. typhi-murium from wild birds, **361**; in gulls, **1881**.
See also Salmonella Gallinarum Infection; Salmonella Pullorum Infection.
Cattle. In Denmark, **688**; in Ibadan, **1338**; chloramphenicol therapy in calf diarrhoea, **3117**; S. naestved from calves, **3499**.
Horses. S. bovis-morbificans in a foal, **26**; outbreak in a stud, **355**.
Immunology. Aeration technique in the preparation of vaccines, **35**; fatal infection in partially resistant mice, **988**; intra-uterine transmission of immunity to paratyphoid in rabbits, **1687**; preparation of polyvalent immune serum, **1695**.
Sheep and goats. S. dublin in goats, **1686**; complicating acute fascioliasis in sheep, **1688**; scours in ewes, **3118**.
Swine. From healthy pigs in Ibadan, **1340**.
SALMONELLA LEXINGTON. See Salmonella Infection, general.
SALMONELLA MANHATTAN. See Milk and Milk Products, hygiene.
SALMONELLA MONTEVIDEO. See Salmonella Infection, avian.
SALMONELLA NAESTVED. See Salmonella Infection, cattle.
SALMONELLA PANAMA. See Salmonella Infection, avian.
SALMONELLA PARATYPHI B. See Salmonella Infection, general.
SALMONELLA PULLORUM INFECTION. Nitrofurazone for chronic carriers, **31**; furazolidone treatment and prophylaxis, **1693**; **3125**; chlortetracycline and oxytetracycline in exp. airborne infection, **3124**; S. heidelberg as a problem in control, **1346**; serology and pathogenesis in

SALMONELLA PULLORUM INFECTION—[cont'd.] growing fowls, 2034; cross-agglutination between brucella and S. pullorum, 2422; flocculation test, 3123; variant strain, 3122; properties of Spanish strains, 3128; presence in joints of battery-reared chicks, 3500; role of cocks in spread, 3856; exp. infection in pullets via cloaca, 3857.
SALMONELLA SAINT PAUL. See Salmonella Infection, avian.
SALMONELLA SAN DIEGO. See Salmonella Infection, avian.
SALMONELLA TYPHI. See Bones, marow; Salmonella Infection, general.
SALMONELLA TYPHI-MURIUM. See Salmonella Infection, general; avian; immunology.
"SALTHION" [A SULPHONAMIDE]. See Sulphonamides.
SAPONINS. Properties of lucerne and other saponins, 195; action of oral doses on ruminants, 196.
See also Bloat.
SARCOMA. See Neoplasms.
SARCOSPORIDIOSIS. In cattle, pigs and deer in Vietnam, 743; morphology of Sarcocystis in different mammals, 744; predilection sites in buffaloes, 2460; and eosinophilic perimyositis in a cow, 2815; correlation between toxoplasma dye test and sarcosporidiosis in sheep and cattle, 2816; electron microscopy, 3938.
SCHISTOSOMA. In China, 1808; eggs in cattle faeces, 799; intermediate hosts, 798; 1103; 1479; occurrence of strains in species of schistosomes, 2204; treatment of S. rhodaini in dogs, 2908; species-specific serological test, 3624; S. capense, 3625.
SCILLIROSIDE. See Poisoning, plants.
SCOURS. See Diarrhoea, Calf; Escherichia Coli.
SCRAPIE. A review, 2482; studies, 2483; clinical and histological features, 1059; exp. infection of goats, 2148; histopathology of the brain stem, 2853; significance of vacuolated neurones in sheep, 117; skeletal muscle of affected sheep, 2854.
SCREW-WORMS. See Callitroga.
SCROTUM. See Genital System.
SEBORRHOEA. See Skin, diseases.
SEDATIVES. See Anaesthesia and Analgesia.
SEED DRESSINGS. See Poisoning, therapeutics and agricultural chemicals.
SELENIUM. See Diathesis, Exudative; Muscles; Poisoning, inorganic.
SEMEN AND SPERMATOZOA.
General. Effect of DDT, BHC and CCl_4 on semen production in bulls and rams, 4011; preparation before service and in relation to semen production, 3765; effect of nutrition on onset of spermatogenesis in calves, 1624; effect of seminal fluid on fertility in horses, 945; effect of urine on motility and fertility of rabbit semen, 3772; effect of heterospermic processing of semen on fertility, 3766; action of antibiotics on bull semen, Tr. foetus and V. fetus, 3011; "tail-end sample" of horse semen, 611; acrosome and post-nuclear cap of bull spermatozoon, 1259; capacitation of rabbit spermatozoa, 4136; migration in female goats, 3439; transport of fowl semen, 1951; fowl semen characteristics in relation to fertility and embryonic survival, 4135; effect of lactic acid on turkey semen, 1261; biochemistry, 3773; biochemistry of cock semen, 3774; labelling of bull semen with radiophosphorus, 4134; radioactive labelling of ram semen, 2664; semen quality in dogs, 1950; 2659; staining methods, 285; 1614; 1949.
See also Brucella Infection, cattle diagnosis; Eimeria Infection, treatment and control; Fertilization; Genital System, testicles; Pseudomonas; Sterility, goats.
Collection. Dummy sow, 288; electro-ejaculator for bulls and rams, 927; 2335; artificial vagina for boars, 1947; collection from rabbits, 3035; hypothalamus and seminal emission, 3042.
Composition. Glycosidases in semen and seminal plasma, 1260; lipids of ram spermatozoa, 1616; localization of labelled glycerol in bovine spermatozoa, 3037; amino acids in semen from bull, dog and boar, 3039.
See also Brucella Infection, sheep and goats.
Diluents and additives. Influence of dilution rate and time on bull semen metabolism, 283; sea water in diluents for bull semen, 612; surface active agents in diluents, 613; fertility and dilution rate, using glycine, in fowl semen, 932; effect of fructose in diluents on motility and fertility of bull semen, 1257; new diluents, 1258; 1611; 4131; antibiotics, 1610; 2070; yeast extracts and fertility, 1612; sodium carbonate activation, 1613; glycine for bull semen, 2337; conception rate with bull semen diluted in glycine-egg yolk-fructose buffer, 2658; effects of glycerol in supravital staining, 3038; diluent for ram semen, 2336; turkey semen diluents, 3041; effect of added sex hormones with and without antibiotics on viability and fertility of fowl spermatozoa, 3775.
Metabolism. Glycerol metabolism by bull spermatozoa, 284; effect of bacteria on metabolism, 396; factors influencing metabolism, 930-931; anaerobic heat production by bull spermatozoa, 1615; carbon dioxide as reversible inhibitor of metabolism, 2663; preliminary ejaculate and metabolism, 3769; plasmalogen in ram semen and its role in metabolism, 4132; lactate inactivation and alkali activation, 3770; presence of glycosidases, 1260; effect of Mg and Ca on dog spermatozoa, 4133.
Motility. Initiation of motility, 617; development of motility, 2665; motility and survival in mixtures from different bulls, 2340; 3767; vesicular fluid and motility, 3768; factors affecting motility, 3434; 3435; movement of bull spermatozoa, 2661.
Storage. Freezing and freeze-drying, 614; 615; 616; 928; 3036; of mammalian spermatozoa, 929; fertility of semen preserved at room temp., 1258; storing in the dry state, 2339; storage at −79°C., 2338; 2662; influence of seminal plasma and maturity of bull spermatozoa on freezing, 3432; effect of ultrasonic waves, 3433; selection of bulls on basis of semen storage characteristics, 3764.
See also Insemination, Artificial.
SENECIO. See Poisoning, plants.
"SENKOBO" SKIN DISEASE. See Dermatophilus Infection.
SEPTICAEMIA, HAEMORRHAGIC. See Pasteurella Infection, cattle.
SEROTONIN. See Circulatory System, heart; Growth, growth hormones; Immunology, allergy and anaphylaxis.
SERUM SICKNESS. See Immunology, general.
SERVICES, VETERINARY. In Eastern China, 1609; in Bulgaria, 4130.
SETARIA [HELMINTH]. S. digitata from cattle and buffaloes in India, 829; differentiation of S. cervi and S. digitata, 2211; S. marshalli "staggers" in sheep, 2921.
SEX. Controlling sex by dipping eggs in hormone soln., 2680; sex diagnosis in early pregnancy, 2686; determination in cattle by examination of chorionic cells, 3797; ratio in offspring of oestrogen-treated fowls, 4148.
See also Behaviour of Animals; Hair; Heredity, general; Insemination, Artificial.
SEX HORMONES.
General. Hormonal control of myometrial function in pregnancy, 293; 4145; 4146; onset of male hormone activity and spermatogenesis in bull calves, 1624; and leather quality, 2367; research problems in animal reproduction, 2686; effect of steroids and similar compounds on ruminant digestion, 3306.
See also Eggs, Hen; Fertility, sheep; Hair.
Androgens. Effect of testosterone on fattening lambs, 1639; 1640; conjugates of bovine serum albumin with testosterone, 1464; anti-infective action of 4-chlorotestosterone, 3015.
Gonadotrophins. Gonadotrophic activity of Polygonum cuspidatum, 294; antigonadotrophin formation in cattle, 939; for induction of superovulation in mice, 940; effect of gonadotrophins on anoestrus in sows, 944; action on ovary, 1266; action of ethylene dibromide on gonadotrophic hormones in fowls, 1898; antagonism between FSH and rat pituitary gonadotrophin, 1958; optimal conditions for biological assay, 2360; joint action of gonadotrophins, 3785.
Oestrogens. Oestrogens in ovaries of laying hens, 4147; biosynthesis in pregnant mares, 4144; hormonal castration and blood lipids in goats, 3445; hormonal castration in gilts, 3444; oestrogen metabolites in urine of calves, 3442; 3443; urinary excretion in bulls, 1265; oestrogenic activity of urine from cows, 624; suppression of mast cells by oestrogen treatment, 3053; reproductive disorders in g. pigs due to contamination of food with oestrogen, 2678; hormonal augmentation of fertility in sheep, 1268-1269; response in spayed ewes to injection of oestrogens and progesterone, 941; synergy between progesterone and oestrogen in ovariectomized cows, 1267; effect of oestrogens on immature chick oviduct, 859; effect of oestrogens on anoestrus in sows, 944; for treatment of pyometra in bitches, 1956; coumestrol from forage crops, 1577; oestrogenic activity of lucerne samples, 1148; separation from avian droppings, 943; effect of oestradiol on body growth and food intake in rats, 632; dangers of synthetic hormones in meat production, 3762; effect of oral stilboestrol on lambs, 3307; influence of oestradiol on castrated male lambs, 2677; stilboestrol implants for lambs, 3062; stilboestrol and hexoestrol for fattening sheep and cattle, 1969; comparative effect of s/c and oral administration of stilboestrol on steers, 629; hexoestrol implants for sucking lambs, 3061; hexoestrol in lamb and mutton production, 1971; hexoestrol implantation in steers and lambs, 630-631; hexoestrol implantation in grazing cattle, 1970; excretion of hexoestrol by rabbits and rats, 1957; effect of feeding stilboestrol on lactation in cows, 508; 2676; effect of feeding stilboestrol and urea on lambs, 1512; effect of oestradiol and stilboestrol on fattening lambs, 1639; 1640; stilboestrol for prevention of abortion in mares, 2681; antimicrobial action as a basis for measurement of diethylstilboestrol,

SEX HORMONES—Oestrogens—(cont'd.)
3446; effect of stilboestrol on pregnancy in rabbits, 4145; 4146; sex ratio in progeny of stilboestrol-treated fowls, 4148; reversal by stilboestrol of depressant effect of cortisone on phagocytic activity, 1230; stilboestrol poisoning in cats, 1909; properties of methylethylstilboestrol, 1625; Ca metabolism in rats given oestradiol, 1185; effect of oestradiolcyclopentylpropriionate on blood cells of fowls, 2679.
See also Blood, corpuscles (white); Clover; Genital System; Lactation; Pregnancy, diagnosis.
Progesterone. Response of spayed ewes to inj. of oestrogens and progesterone, 941; induction of delayed nidation in rats, 942; synergy between progesterone and oestrogen in ovariectomized cows, 1267; effect of progesterone on fattening lambs, 1639; 1640; given prepartum in cows, 1955; in peripheral blood, 3051; blood levels in ewes, 3052; biosynthesis in pregnant mares, 4144.
See also Mammary Gland.
SHEEP.
General. Reproduction wastage in merinos, 1953.
See also Behaviour of Animals; Blood; Books, zootechny; Clover; Conditioned Reflexes; Copper; Digestive System, general; ruminant digestion; Embryos; Euthanasia; Genital System; Growth, growth factors; Manganese; Molybdenum; Nervous System, general; Parathyroid Glands; Pregnancy, diagnosis; Salivary Glands; Sex Hormones, oestrogens; progesterone; Sodium Chloride; Surgery; Teeth; Temperature, body; environmental; Water; Wool; Zootechny.
Arthropod parasites. See Blowflies and Fleshflies; Damalinia; Mange; Melophagus; Oestridae, Oestrus; Parasiticides; Ticks.
Bacterial and fungous diseases. See Brucella Infection; Brucella Tularensis Infection; Clostridium Welchii Infection; Dermatophilus Infection; Erysipelothrix Monocytogenes Infection; Erysipelothrix Rhusiopathiae Infection; Foot Rot; Fusiformis Infection; Leptospira Infection; Mycobacterium Johnei Infection; Pleuro-Pneumonia, Ovine Contagious; Salmonella Abortus-Ovis Infection; Staphylococcus Infection; Stomatitis, General; Streptococcus Infection; Vibrio Fetus Infection.
Diseases, general. See Abscesses; Ataxia; Bones, diseases; Books, diseases, general; Cobalt; Copper; Diabetes; Digestive System, intestines; ruminant digestion; Eyes, diseases; Genital System, prepuce; vagina; Jaagziekte; Neoplasms; Nutrition and Metabolism, sheep; Parturition; Pneumonia, General; Poisoning; Pregnancy; Respiratory System, diseases; Sterility; Stomatitis, General; Ticks, Argasidae; Trace Elements; Urinary System, calculi; White Muscle Disease.
Helminth parasites. Subclinical infestation, tolerance level, and effect on wool production, 165; on irrigated pastures, 1485; epidemiology in Australia, 1821; 2538.
See also Anthelmintics; Cystocaulus; Dictyocaulus; Echinococcus; Elaeophora; Growth, general; Haemonchus; Helminth Parasites, General; Muellerius; Nematodes, General; Setaria; Strongyloides; Trichostrongylus; Trichuris.
Protozoan diseases. See Anaplasma Infection; Babesia Infection; Eimeria Infection; Globidium; Toxoplasma Infection.
Virus and rickettsial diseases. See Abortion, Ovine Virus; Bluetongue; Dermatitis, Ovine Contagious Pustular; Encephalomyelitis, Ovine; Foot and Mouth Disease, immunology; "Kisenyi Disease"; Nairobi Sheep Disease; Pox Diseases; Psittacosis-Lymphogranuloma Group; Rabies, immunology; Rickettsia Infection, Q fever; Scrapie; "Visna".
SHEEP POX. See Pox Diseases.
SHEEP SCAB. See Mange.
"SHIPPING FEVER". Viral agent?, 1332.
See also Pasteurella Infection, cattle.
SHOCK. Irreversible haemorrhagic shock in germ-free rats, 3711.
SIDEROSIS. See Iron.
SILAGE. Preservation in polyvinyl chloride film, 610.
See also Clostridium Botulinum Intoxication; Helminth Parasites, General; Ketosis.
SILICONES. See Bloat.
SIMULIUM. Behaviour of S. ornatum on grazing cattle, 471.
See also Myxomatosis.
SINDBIS VIRUS. Immunological overlap with Western equine encephalomyelitis virus, 3223.
SINGAPORE. See Encephalitis, Japanese B.
SINUSITIS, INFECTIOUS, OF TURKEYS. Caused by antibiotic-resistant PPLO, 721; egg transmission, 722; complicating factor in infectious sinusitis of turkeys, 724; symposium. 3179-3183; effect of antibiotics on agent from turkeys, 3188; 3189; treatment with antibiotics and nitrofurans, 3190.
SINUS UROGENITALIS. See Genital System, diseases.
SIPHONA. Repellents for control of hornflies, 1092; control of, and weight response in cattle, 2526; 3999; butoxy polypropylene glycol, methoxychlor and methylated naphthalenes for control of biting flies on cattle, 3270.
SKIN.
General. Skin thickness in cattle, 250; 3403; grafting, in horses, 3021; histology in dog and cat, 3713.
See also Embryos; Hides; Nervous System, general; Nutrition and Metabolism, sheep; Sweating and Sweat Glands; Wool.
Diseases. Prednisolone for eczema in dogs, 229; lobeline treatment of some allergic skin conditions in dogs, 881; physical factors in dermatomycosis, 1042; exudative epidermitis in pigs, 1198; pityriasis rosea in piglets, 1199; radiodermatitis in horses, 1891; enteritis and dermatitis in piglets, 2235; dermatitis by penicillin in milk, 2382; intestinal flora in horses with certain skin diseases, 3112; general pathology of skin, 3712; polythionates and sodium thiosulphate in seborrhoea, 3714; skin diseases in cattle in Kenya and their effect on leather, 4067.
See also Dermatophilus Infection; Heredity; Onchocerca; Poisoning, plants; Radiations; Spirochaeta Infection; Streptothricosis, Cutaneous; Surgery, in dogs.
SKULL. See Vitamins, vitamin A.
SLAUGHTER. See Abattoirs; Books, food hygiene; Euthanasia; Hygiene, food.
SNAILS AND SLUGS. Streptomycin-induced inhibition of growth and reproduction in Australorbis glabratus, 1479; book, molluscan anatomy, 1648; molluscicidal action of granulated zinc, 3626.
See also Fasciola; Hymenolepis; Lungworms; Schistosoma.
SNAKES. See Tapeworms; Venoms.
SODIUM AND SODIUM COMPOUNDS. Salivary Na and K in sheep, 529; action of sodium desoxycholate on arthropod-borne viruses, 1774; Na adsorption and excretion in pigs, 3332.
See also Anthelmintics, general; for sheep and goats; Blood, composition; Bones, diseases; Nutrition and Metabolism, carnivores; Oestridae, Hypoderma; Poisoning, inorganic; Semen and Spermatozoa, diluents; Skin, diseases; Sodium Chloride; Thyroid Gland; Trichostrongylus; Urinary System, calculi; Vermin Control; Water.
SODIUM CHLORIDE. Sodium versus chloride in salt deficiency of cows, 528; Salt tolerance of sheep, 1165; salt tolerance of turkeys, 1166.
See also Adrenal Gland, general; Genital System, uterus; Nutrition and Metabolism, carnivores; Oestridae, Hypoderma; Poisoning, inorganic; Thyroid Gland; Urinary System, calculi; Water.
SODIUM FLUOROACETATE ("1080"). See Vermin Control.
SOD DISEASE. See Poisoning, plants.
SOIL. Strontium-calcium movement from soil to man, 1203; soil type in relation to deficiencies, 1856.
See also Anthelmintics, general; Clostridium Chauvoei Infection; Copper; Cryptococcus; Radiations.
SORBITOL. Vitamin-sparing action, 860.
SOYA MEAL. Panmyelopathia in cattle poisoned by trichlorethylene-extracted soya meal, 238.
See also Poisoning, organic.
SPAIN. See Bluetongue; Salmonella Gallinarum Infection; Salmonella Pullorum Infection.
SPARGANUM. S. raillieti larvae in pigs, 1482.
SPARROWS. See Encephalomyelitis, Equine; Toxoplasma Infection, general.
SPELEOGNATHUS. In the cranial sinuses of cattle in Ruanda Urundi 2530.
SPERMATOGENESIS. See Genital System, testicles; Semen and Spermatozoa.
SPERMINE AND SPERMIDINE. See Blood, composition.
SPINAL COLUMN. See Column, Vertebral.
SPINAL CORD. See Nervous System.
SPIRAMYCIN. See Streptococci, General.
SPIRILLUM. Associated with contagious conjunctivitis in fowls, 3890.
SPIROCERCA. S. lupi in dogs associated with oesophageal sarcoma, 4037.
SPIROCHAETA INFECTION. Brucellosis and spirochaetosis in hares, 703; chick embryo vaccine for control in fowls in Iran, 2764; in skin lesions in pigs, 3150; 3151.
"SPLAYLEG". See Dysplasia, Hip.
SPLEEN. Lesions in dogs, resembling Gandy-Gamna nodules, 1886; presence of microbial growth stimulants, 3537.
See also Blood, corpuscles (white); Capillaria; Neoplasms, in dogs; Circulatory System, general; Growth, growth factors; Immunology, antibodies and antigens; Mycobacterium Tuberculosis Infection, treatment; Plasmodium Infection; Radiations.
SPOROTRICHUM. Precipitin studies of antigens from different species, 2079.
SPRING-SUMMER ENCEPHALITIS. See Encephalitis, Spring-Summer.

SPUTUM. See Mycobacterium Tuberculosis Infection, diagnosis.
SQUIRRELS. See Hepatozoon.
"SR-692". See Brucella Infection, treatment.
STABLE FLIES. See Stomoxys.
"STAGGERS". See Poisoning, general; plants; Setaria [Helminth].
STAPHYLOCOCCUS INFECTION.
General. Antigenic structure of S. pyogenes, 2; S. aureus versus S. pyogenes, 648; resistance to antibiotics, 972; penicillin susceptibility and virulence, 1301; antigenic specificity of coagulase in relation to bacteriophage group, 1994; necrotizing action of alpha toxin, 3080; penicillin-resistant, in milk, 3470; in milk, 3471; differentiation of pathogenic and non-pathogenic organisms, 3815; disodium p-nitrophenylphosphate medium, 3816.
See also X-Rays.
Cattle. Serological identification of bovine coagulase-positive staphylococci, 319; characters and distribution of certain udder-pathogenic staphylococci, 647; 3814; staphylococci isolated from cattle, 1650; 1993; anti-staphylolysin titre and chronic mastitis, 2715; treatment of mastitis with i/m neomycin sulphate and polymyxin B sulphate, 2716; clin. and bact. study of mastitis, 3078; 3813; bacteriophage typing and sensitivity to penicillin of mastitis strains, 3079.
Fowls. Wing tip gangrene, 2273.
Goats. Mastitis in West Bengal, 649; experimental mastitis, 2717.
Sheep. Mastitis, 1; lysotypes of staphylococci from cattle and sheep, 1993.
STARCH. See Digestive System, ruminant digestion.
STARVATION. See Blood, general; composition; Digestive System, ruminant digestion.
STATISTICS. See Foot and Mouth Disease, immunology; Reports; Technique, miscellaneous.
STEMPHYLIUM. See Poisoning, plants.
STEPHANOFILARIA. Hump sores in Pakistan caused by S. assamensis, 830; stibophen treatment of S. dedoesi infestation, 831.
STEPHANURUS. Exp. infestation of pigs with S. dentatus, 4012.
STERILITY.
General. Asymptomatic, in domestic animals, 1633; in g.pigs by feeding pelleted food contaminated with oestrogens, 2678; temporary nutritional stress and infertility in mice, 2935; book, breeding problems and artificial insemination, 3076; cortisone treatment, 3790; X-rays and female fertility in some mammals, 4151.
See also Fertility; Genital System, oestrous cycle; ovaries and ova; testicles; Semen and Spermatozoa; Sex Hormones.
Cattle and buffaloes. Endocrine activity, body temp., genital secretions and sterility/fertility in buffaloes, 946; report of Belgian committee for control, 1631; sexual stimulation in infertile cows, 1960; vitamin E treatment, 1961; treatment of cows returning to service, 2355; increased incidence and control, 2683; calciferol treatment, 2684; pathological conditions in old bulls with impaired fertility, 3055; study of uteri in cows of low fertility, 3167.
See also Reports, international; Vibrio Fetus Infection.
Goats. Sterility in goats due to seminal congestion associated with E. coli, 2029.
Horses. Causes in mares, 295; oestrous cycle and infertility in mares in Australasia, 629; treatment of mares with parasympathetic excitants, 1270; statistical study in mares, 1632; breeding problems in mares, 2353.
Sheep. Subterranean clover, 3660.
Swine. See Genital System, prepuce.
STEROIDS. See Sex Hormones.
STETHOSCOPE, ELECTRONIC. See Technique and Apparatus, miscellaneous.
STIBOPHEN. See Anthelmintics, for cattle.
STICKER'S TUMOUR. See Neoplasms, general; in dogs.
STILBAMIDINE. Antifungal activity, 393.
See also Trypanosoma Infection, treatment.
STILBOESTROL. See Sex Hormones, oestrogens.
STILESIA. See Anthelmintics, for sheep.
STILLBIRTH. See Aujeszky's Disease.
STOMACH. See Digestive System.
STOMATITIS, GENERAL. Probably due to Fusiformis necrophorus, in lambs, 1385; an infectious ulcerative form in cattle, 3229; 3959.
STOMATITIS, VESICULAR. Typing of virus from outbreaks in pigs, 127; differentiation from vesicular exanthema by inj. into tongue of fowls, 430; susceptibility of man, and epidemiology, 748; growth in tissue culture, 749, 3567; cytopathogenesis, 1414; persistence of antibodies in cattle, 1767; in the U.S.A., 2124; electron microscopic demonstration of virus in bovine oral mucosa, 2125; inactivated chick embryo vaccine, 3941.
See also Vesicular Diseases, General.
STOMOXYS. Repellents against stable flies, 1801; cattle weight gains resulting from control, 2526; butoxy polypropylene glycol, methoxychlor and methylated naphthalenes for control of biting flies on cattle, 3270; stable flies and milk production, 3998; effect of biting flies on weight gain in cattle, 3999.
STRAIN 19. See Brucella Infection, immunology.
STRANGLES. See Streptococcus Equi Infection.
STRAWBERRY FOOT ROT. See Dermatophilus Infection.
STREPTOBACILLUS. Exp. infection of rats with S. moniliformis, 1025.
STREPTOCOCCI, GENERAL. Toxic cellular components of Group A, 1302; book, viridans group, 1986; susceptibility to erythromycin, streptogramin (antibiotic 900), oleandomycin, spiramycin, novobiocin and cycloserine, in vitro, 2072; pigment formation by Group B, 2383; streptococcal bacteriophages, 3082; susceptibility of haemolytic strains to antibiotics in vitro, 3083.
STREPTOCOCCUS AGALACTIAE. See Mastitis, Bovine; Streptococcus Infection, cattle; swine.
STREPTOCOCCUS DYSGALACTIAE. See Mastitis, Bovine; Streptococcus Infection, cattle; swine.
STREPTOCOCCUS EQUI INFECTION (STRANGLES). Incidence in Croatia, 16; malignant form, 651.
STREPTOCOCCUS INFECTION.
General. Differentiation of group A streptococci by R antigen, 322; susceptibility of inbred mice to Group A infection, 652.
Cattle. Str. pneumoniae infection in calves, 320; bacterial endocarditis in cattle, 2384; isolation of Str. agalactiae, Str. uberis and Str. dysagalactiae from tonsils, 3081.
See also Mastitis, Bovine.
Dogs. Toxin and exp. nephrosis, 2000.
Horses, donkeys and mules. Pathology and histology of S. pyogenes septicaemia, 5.
See also Streptococcus Equi Infection.
Sheep and goats. Sheep mastitis, 1998.
Swine. Role of streptococci in pig diseases, 321; isolation of Str. agalactiae, Str. dysgalactiae and Str. uberis from tonsils, 3081.
STREPTOCOCCUS PNEUMONIAE. See Streptococcus Infection, cattle.
STREPTOCOCCUS UBERIS. See Mastitis, Bovine; Streptococcus Infection, cattle; swine.
STREPTODORNASE AND STREPTOKINASE. See Enzymes.
STREPTOGRAMIN (ANTIBIOTIC "900"). See Streptococci, General.
STREPTOMYCES. See Anthelmintics, for swine; Antibiotics, General.
STREPTOMYCIN. Distribution of dihydrostreptomycin and tetracycline in the body, 244; pharmacology and toxicology of streptomycin and dihydrostreptomycin and their pantothenates, 579; toxicity for g. pigs, 580; increasing tolerated dose, 1914; effect of glycerine on toxicity of mixtures with isoniazid, 2629; acute toxicity for fowls and pigeons of procaine penicillin G and dihydrostreptomycin sulphate, 3384.
See also Snails and Slugs; Vitamins, vitamin B_1.
STREPTOTHRICOSIS, CUTANEOUS. See Dermatophilus infection.
"STRINGHALT". In cattle, 2979.
STROBANE. See Parasiticides, chlorinated hydrocarbons.
STRONGYLOIDES. Attempt to induce passive immunity to S. papillosus in kids and lambs, 1106; migration in swine after percutaneous infection with S. ransomi larvae, 2537; S. papillosus in sheep and goats, 3280.
STRONGYLUS. In horses in Sardinia, 807.
STRONTIUM. Sr and Sr 90 in food and bones, 3334; 3335; 3336; metabolism of Sr 90 in goats, 3369.
See also Radiations.
STRYCHNINE. See Mycobacterium Tuberculosis Infection, tuberculin test; Poisoning, organic.
SUBULURA. Life cycle of S. suctoria, of fowls, 819.
SUCCINYLCHOLINE. A muscle relaxing agent, 3019.
See also Anaesthesia and Analgesia.
SUDANESE REPUBLIC. See Nocardia; Onchocerca.
SUGARS, GENERAL. See Fatigue.
SULKOWITCH TEST. See Blood, composition.
SULPHABENZPYRAZINE. See Eimeria Infection, treatment.
SULPHADIAZINE. See Toxoplasma Infection, general.
SULPHADIMIDINE. See Eimeria Infection, treatment; Oedema Disease of Pigs; Pasteurella Infection, avian.
SULPHAGUANIDINE. See Poisoning, therapeutics.
SULPHAMERAZINE. See Oedema Disease of Pigs.
SULPHAMETHAZINE. See Sulphadimidine.
SULPHANILAMIDE. See Ketosis.
SULPHAQUINOXALINE. Pharmacological study in cattle, 901; effects of continuous feeding on rabbit mortality, 3392.
See also Eimeria Infection, treatment; Pasteurella Infection, avian; Poisoning, therapeutics; Vitamins, vitamin K.
SULPHONAMIDES, GENERAL. In veterinary medicine, 3012; Use of "salthion" in veterinary medicine, 3014.
See also Pleuro-Pneumonia Group.

SULPHONES. See Toxoplasma Infection, general.
SULPHUR. Fate of S^{35}-labelled sulphate in baby pigs, 2958.
See also Isotopes, Radioactive.
"SUMMER BLEEDING DISEASE". See Elaeophora.
SUMMER MASTITIS. See Corynebacterium Infection, cattle.
SURAMIN. See Trypanosoma Infection, treatment.
SURFACE ACTIVE AGENTS. Effect of feeding on susceptibility to infection, 1387.
See also Bloat; Nutrition and Metabolism, general; Semen and Spermatozoa, diluents and additives.
SURGERY.
Cattle. Effect of castration method on calves, 1638; caesarian section, 3781.
See also Adrenal Gland, general.
Dogs. Dermalon skin sutures, 308; text book, 646; frontal leucotomy against aggressiveness, 3803.
See also Clostridium Tetani Infection.
Horses. See Skin, general.
Sheep. Caesarian section, 3782.
See also Adrenal Gland, general.
Swine. Fertility after caesarian section, 1954; caesarian section, 3449.
SURINAM. See Salmonella Group.
SURRA. See Trypanosoma Evansi Infection.
SWAMP FEVER. See Anaemia, Equine Infectious.
SWAYBACK. See Ataxia.
SWEATING AND SWEAT GLANDS. Histological study in normal and dry-coated horses, 549; sweating and sympathetic innervation, 907; apocrine gland density and heat tolerance in Rhodesian cattle, 1235; evaporation rate from the skin of cattle, 1236; 2309; sweating in lab. animals, 1919; effect of season and exercise on volume of sweat glands in zebu and European cattle, 3406; sweating and heat tolerance in cattle, 3733.
SWEDEN. See Bacillus Anthracis Infection; Brucella Infection, cattle; Encephalomyelitis, Ovine; Salmonella Group; Salmonella Infection, general.
SWINE.
General. Brooder for raising disease-free pigs, 636; determination of fatness in live pigs, 2694.
See also Anaesthesia and Analgesia; Blood, composition; groups; Books, nutrition; Fertility; Genital System, prepuce; testicles; uterus; Growth, general; growth factors; Insemination, Artificial; Lactation; Mammary Gland; Pancreas; Potassium; Sex Hormones, gonadotrophins; oestrogens; Sodium; Surgery; Thyroid Gland; Vitamins, vitamin E; Weight.
Arthropod parasites. See Parasiticides, phosphorus compounds.
Bacterial and fungous diseases. See Brucella Infection, immunology; Candida Albicans Infection; Clostridium Welchii Infection; Encephalitis, General; Eperythrozoon; Erysipelothrix Monocytogenes Infection; Erysipelothrix Rhusiopathiae Infection; Escherichia Coli Infection; Fungi, General; Haemophilus; Joints; Leptospira Infection; Mycobacterium Tuberculosis Infection, general; Oedema Disease; Pleuro-Pneumonia Group; Septicaemia, Puerperal; Spirochaeta Infection; Streptococcus Infection; Vibrio Suis Infection.
Diseases, general. Principal diseases, 2981.
See also Abscesses; Anaemia, General; Blood, composition; Broncho-Pneumonia, Porcine; Diabetes; Enteritis, Porcine; Genital System, diseases; Haemolytic Disease of New-Born; Hair; Heredity; Leucosis; Liver, diseases; Muscles; Neoplasms, in swine; Nervous System, diseases; Nutrition and Metabolism, in relation to disease; Oedema Disease of Pigs; Parasiticides, general; Parturition; Poisoning, inorganic; Respiratory System, diseases; Rhinitis, Porcine Atrophic; Skin, diseases; Syncope, Fatal, of Pigs; Tail; Trembling of Piglets; "Yellow Fat Disease".
Helminth parasites. See Anthelmintics; Ascaris; Books, parasitology; Echinococcus; Fasciola; Helminth Parasites, General; Hyostrongylus; Lungworms; Nematodes, General; Sparganum; Stephanurus; Strongyloides; Trichinella; Trichuris.
Protozoan diseases. See Sarcosporidiosis; Trichomonas Infection, general; swine; Trypanosoma Infection, treatment.
Virus and rickettsial diseases. Virus diseases of pigs in Kenya, 128; pneumotropic viruses in man and pigs, 1049; aetiological relationship between certain types of gastroenteritis and pneumonia in pigs, 1195; a highly infectious afebrile gastro-enteritis, 2161.
See also Aujeszky's Disease; Diarrhoea, Porcine Virus; Encephalitis, Japanese B; Encephalomyelitis, Porcine; Exanthema, Vesicular; Foot and Mouth Disease, virus; Influenza, porcine; Pneumonia, Porcine Virus; Pox Diseases, swine pox; Rabies; Stomatitis, Vesicular; Swine Fever; Swine Fever, African; Talfan Disease.
SWINE ERYSIPELAS. See Erysipelothrix Rhusiopathiae Infection.
SWINE FEVER.
General. Bone structure changes in infected pigs, 120; diagnostic value of non-purulent encephalomyelitis, 765; in Great Britain, 1429; gamma globulin treatment, 1431; provocation of masked virus in lungworm-infested pigs by feeding ascaris larvae, 1781; 2484; complicated by Bact. viscosum, 2151; isolation of E. monocytogenes from infected pigs, 2738; origin, 2856; urinary excretion of neutral ketosteroids in normal and infected pigs, 3235.
Immunology. Simultaneous injection of serum and crystal violet vaccine, 118; blood protein in pigs before and after immunization, 119; urea levels in muscles of healthy and infected pigs, 121; lapinized vaccine, 1063; 2153; 2154; 3236; formolized adsorbate vaccine, 1430; vaccination in garbage-fed pigs in Connecticut, 1782; blood from infected pigs, treated with crystal violet vaccine, used as antigen, 2485; in Yugoslavia, 2486; accidental transmission by vaccination, 2857; crystal violet vaccine, 3237.
Virus. Size, 122; action of sodium merthiolate on virus, 1432; tissue culture, 2152; electron microscopy, 3964.
SWINE FEVER, AFRICAN. Blood picture in pigs, 123; virus diseases of pigs in Kenya, 128; viraemia and immunity, 2155.
SWITZERLAND. See Foot and Mouth Disease, immunology; Wild Animals and Birds.
SYNCOPE, FATAL, OF PIGS. Observations, 1551; changes in adrenal and pituitary glands, 2270; and dystrophy of skeletal muscles in pigs, 2983; thyroid lesions, 2984; diameter of heart muscle fibres and predisposition to fatal syncope, 3701.
SYNGAMUS. CCl_4 treatment in pheasants, 1124; in turkeys, 1817.
SYNNEMATIN B. Bactericidal action, 3165.
SYNOVITIS, INFECTIOUS, OF FOWLS. Control, 2176; 3907-3909.
SYPHACIA. Staining and counting of S. obvelata in mouse faeces and ingesta, 492.

T

TABANUS. Tabanid flies and incidence of surra in camels in Rajasthan, 65.
TAENIA. Coenurus (T. brauni) in man and animals in the Belgian Congo, 477.
See also Cysticercus.
TAENIORHYNCHUS. Natural hosts in Uganda determined by the precipitin test, 4002.
TAIL. Necrosis in unweaned rats, 3317; effect of humidity and environmental temp. on ringtail in rats, 3706; necrosis in piglets, 4070.
See also Heredity, swine.
TALFAN DISEASE. A transmissible polio-encephalomyelitis in pigs, 1066; comparison with Teschen disease, 2180.
TANGANYIKA. See Reports.
TANTALUM. See Radiations.
TAPEWORMS. The grass snake Zamenis hippocrepis as intermediate host of cat tapeworms, 3279; exp. infection of tapeworms and oribatid mites with Nosema helminthorum, 3558.
See also Anthelmintics, and under generic names.
TASMANIA. See Vermin Control.
TASTE. Thalamic relay for taste in the goat, 1599.
TEATS. See Mammary Gland.
TECHNIQUE AND APPARATUS.
Bacteriological. Continuous culture, 306; cultivation of anaerobic spore-bearing bacteria, 2063; biphasic system of growing in concentrated culture, 2075; growth of contaminants and mutants in continuous culture, 2368; stainless steel closures instead of cotton plugs in culture tubes, 2369; teepol as substitute for bile salts in culture media, 2370; brucella vortex aeration culture apparatus, 2415; growth stimulants in ox spleen, 3537; control of sterility of biological products by medium for simultaneous aerobic-anaerobic cultivation, 4157.
See also Books, bacteriology; Brucella Group; Candida Albicans Infection; Clostridia, General; Escherichia Coli Infection, general; Leptospira Infection, general; Mycobacteria General; Mycobacterium Tuberculosis; Nocardia; Salmonella Group; Salmonella Infection, immunology; Technique, staining; Vibrio Fetus Infection, general.
Collection of body tissues and fluids. See Anaemia, Equine Infectious; Blood; Encephalomyelitis, Equine; Genital System, testicles; Insemination, Artificial, swine; Liver, general; Nervous System, cerebrospinal fluid; Pancreas; Salivary Glands; Semen and Spermatozoa.
Electrophoresis. See Electrophoresis.
Haematological. See Blood.
Histological. See Technique, staining.
Immunological. See Immunology.
Microscopy (general). Book, modern methods, 318; ultraviolet television colour-translating microscope, 1278; study of germinating spores of B. cereus by television and electron microscopy, 1311.

TECHNIQUE AND APPARATUS—[cont'd.]
Microscopy (electron microscopy). See Abortion, Ovine Virus; Bacillus Cereus; Bronchitis, Avian Infectious; Fowl Paralysis and Avian Leucosis Complex; Influenza, virus; Leptospira Infection, general; Newcastle Disease, virus; Pox Diseases, fowl pox; pigeon pox; Psittacosis-Lymphogranuloma Group; Sarcosporidiosis; Stomatitis, Vesicular; Swine Fever, virus; Technique, microscopy (general).
Miscellaneous. Method for tabulating data, **305**; jet injection of joints, **307**; technique of P.M. examination of domestic animals, **314**; i/v inj. in rats, **955**; technique for climatological, nutritional and energy metabolism studies in ruminants, **1276**; clearing of brain homogenates by lysolecithin, **1280**; polyethyene catheter for i/v infusion, **1281**; electronic stethoscope, **2699**; indirect calorimetry, **2700**; apparatus for uncontaminated injections, **3064**; a cannulated Thiry-Vella fistula for fowls, **3457**.
See also Adrenal Gland, cortical hormones; Anaesthesia and Analgesia, general; Books, miscellaneous; Calcium; Circulatory System, vessels; Digestive System, general; ruminant digestion; Embryos, Fowl; Freezing, Freeze-Drying and Refrigeration; Hygiene, food; Isotopes, Radioactive; Pneumonia, General; Poisoning, inorganic; organic; Thyroid Gland; Urinary System, general.
Parasitological. Cultivation and development of larval cestode fragments in vitro, **2535**; faeces concentration technique, **3927**; faecal egg count and enumeration of protozoan cysts, **3990**.
See also Fasciola; Necator; Schistosoma; Syphacia; Trichostrongylus; Trypanosoma Infection, general.
Photography. A fixed-focus close-shot camera mounting, **1283**; colour photography of the retina, **4160**.
Staining. Combination stain for acid-fast bacilli and fungi, **720**; differentiation of somatic and autonomic nerve fibres in sections, **956**; method for mitochondria, **1279**; vital staining of bact. cultures, **1388**; acid-fast and Gram-staining of bact. films, **1973**; polyvinyl pyrrolidone as mounting medium for stains, **1976**; quantitative Gram-staining with labelled iodine, **4156**.
See also 17-Ketosteroids; Rabies, general; Semen and Spermatozoa; Syphacia; Trypanosoma Infection, general.
Tissue culture. See Tissue Culture.
Viruses and rickettsia. Cultivation of viruses and rickettsia in chick embryo chorio-allantoic ectoderm, **146**; separation and identification of avian viruses, **2508**.
See also Borna Disease; Foot and Mouth Disease, immunology; virus; Immunology, antibodies and antigens; Influenza, virus; Newcastle Disease, virus; Rabies, general; Rhinotracheitis, Bovine Infectious; Tissue Culture.
"TEEPOL". See Technique, bacteriological.
TEETH. Effect of breed and nutrition on dentition in cattle, **251**; wear in sheep's teeth, **2635**; occlusion in sheep, **2636**.
See also Poisoning, inorganic.
TELEVISION MICROSCOPY. See Technique, microscopy.
TEMPERATURE.
Body. And respiration rate in buffalo cows, **1917**; hibernation and heat regulation, **1918**; rectal, scrotal, subscrotal and endotesticular temp., in bulls, **2343**; relationship between thyroid and adrenals in regulation, **2649**; chemical thermoregulation in piglets, **3023**; regulation in new-born lambs, **3401**; in lambs, **3402**; heat production and loss in dogs, **4109**.
See also Brucella Infection, immunology; Genital System, testicles; Parturition; Sterility, cattle and buffaloes; Temperature, environmental.
Environmental. Environmental physiology and shelter engineering, **589-590**; **609**; **628**; **3396-3399**; **4105-4107**; apocrine glands and heat tolerance in Northern Rhodesian cattle, **1235**; influence of high temp. on immature fowls, **1584**; disorders due to heat, **2617**; effect of climatic conditions on growth and development in mice, **3022**; effect of restraint on heat tolerance in monkeys, **3060**; response of goats to temp. 0°—40°C., **3400**; effect on puberty in calves, **3735**; and weight gain in pigs, **3736**; environmental physiology of Northern Rhodesian cattle, **4108**; effect of high temp. on foetal dwarfism in sheep, **4143**.
See also Altitude; Blood general; volume; Frost-Bite; Growth, growth factors; Nervous System, general; Nutrition, in cattle; Sweating and Sweat Glands; Tail; Thyroid Gland; Vitamins, general.
TENDONS. See Joints.
TERATOLOGY. Acroteriasis in Swedish Friesians, **299**; congenital arthrogryposis and hydranencephaly in calves, **300**; epitheliogenesis imperfecta in Swedish cattle, **301**; congenital tail deformity in pigs, **1965**; epitheliogenesis imperfecta in foals, **3056**; malformation of the duodenal loop in fowls, **3791**; borderland of embryology and pathology, **4164**.
See also Embryos, Fowl; Eyes, diseases; Genital System, diseases; Heredity; Vitamins, vitamin E.
TERRAMYCIN [OXYTETRACYCLINE]. See Oxytetracycline.
TESCHEN DISEASE. See Encephalomyelitis, Porcine.
TESTICLES. See Genital System.
TESTOSTERONE. See Sex Hormones, androgens.
TETANUS. See Clostridium Tetani Infection.
TETANY. See Magnesium.
TETRACYCLINES. Distribution of tetracyclines in the body, **244**; international standard for tetracycline, **2302**; mode of action, **2630**.
See also Chlortetracycline; Oxytetracycline.
TETRAMETHYLTHIURAM DISULPHIDE. See Poisoning, therapeutics.
TEXAS FEVER. See Babesia Infection, cattle.
THAILAND. See Rinderpest.
THEILERIA INFECTION (PIROPLASMOSIS). Effect of berenil on subclinical infection in cattle and buffaloes, **82**; chemotherapy in the U.S.S.R., **740**; **3549-3553**; failure of chloramphenicol in T. dispar infection, **741**; chemoprophylaxis, **1409**; in cattle in Macedonia, **1751**; transmission of T. sergenti by Haemaphysalis bispinosa, **2105**; T. sergenti infection in cattle, **2106**; control in cattle in Kenya, **3201**; "turning sickness" in South African cattle, **3548**; lesions and pathogenesis, **3934**; Theileria, Gonderia and Cytauxzoon infection, **3935**.
THEILER'S DISEASE. See Encephalomyelitis, Murine.
THELAZIA. Treatment in cattle in Roumania, **3285**.
THERAPEUTICS. See Books; Pharmacology; Poisoning, therapeutics.
THIAMINE. See Vitamins, vitamin B_1.
THIOGUANINE (ThG). See Embryos, Mammalian, and Foetuses.
THORIUM DIOXIDE. See X-Rays.
THROMBOPLASTIN. See Blood, coagulation.
THROMBOSIS. See Circulatory System, general.
THYMUS. Lymphocyte renewal in rat thymus, **3032**.
THYROID GLAND. Function in dogs, **213**; histology and function of developing thyroid in normal and goitrous g.pigs, **214**; effect of thyrotropin on milk yield and heart rate in goats, **215**; in vivo measurement of radioiodine content in cattle, **542**; effect of light in rats, **920**; goitrogenic effect of white clover, **1182**; pathways of thyroid phosphorus metabolism, **1863**; NaCl stimulation in the mouse, **1864**; thyroxine excretion as possible cause of goitre, **1876**; function in pigs, **2256**; presence of triiodothyronine in fowls, **2328**; function in relation to iodine metabolism in cattle and pigs, **2605**; relationship between thyroid and adrenals in temp. regulation, **2649**; goitrogenic substances in food, **3347**; I^{131} uptake in foetal sheep, **3348**; diseases in dogs and cats, **3362**; **3363**; goitrogen in milk produced on kale, **3692**; estimation of effectiveness of goitrogens in cattle, **3693**; thyroid and heat tolerance, **3734**; effect of light and temp. on function, **3756**; thyroid activity and reproductive phenomena in gilts, **3783**.
See also Iodine; Magnesium; Moulting; Mycobacterium Tuberculosis Infection, immunology; Neoplasms, in sheep; Radiations; Syncope, Fatal, of Pigs.
THYROXINE. See Lactation; Thyroid Gland; Wool.
THYSANOSOMA. See Anthelmintics, for sheep.
TICK PARALYSIS. See Ticks.
TICKS.
General. Effect of tick control and phosphate supplements on weight in cattle, **1095**; vectors of piroplasmosis in Macedonia, **1751**; ticks and tick-borne diseases in France, **3275**.
See also Babesia Infection, cattle; Encephalitis, General; Encephalomyelitis, Equine; Encephalomyelitis, Ovine; Parasiticides; Rickettsia Infection, general.
Argasidae. Incidence of O. lahorensis and tick paralysis in sheep in Yugoslavia, **1474**; tick paralysis in sheep due to O. lahorensis in Tadzhikistan, **1804**; Otobius megnini in British Columbia, **1805**; embryonic development of O. moubata and transovarian passage of Borrellia duttoni, **4005**.
Ixodidae. Control of B. microplus by dipping, **1094**; Haemaphysalis bispinosa transmitting Theileria sergenti infection in cattle, **2105**; neuropathological site of tick paralysis due to exp. Dermacentor andersoni infestation in dogs, **2201**; D.D.T. resistance of B. microplus, **2528**; total sulphydryl content of embryos of arsenic-resistant & -sensitive B. decoloratus, **2529**; rhipicephaline tick toxicosis in cattle, **2902**; ecology of B. microplus, **3274**; host specificity in Bechuanaland, **4003**.
See also Encephalitis, General; Encephalomyelitis, Equine; Gonderia Infection; Rickettsia Infection, Q fever.
TIGERS. See Nutrition, in relation to disease.
TIN ARSENATE. See Anthelmintics, general; for sheep.
TINEA. See Ringworm.
TISSUE CULTURE. Trypsin-dispersed kidney, **639**; viral spectra of tissue culture lines of human cells, **779**; effect of somatotropin on cells, **908**; virus titration in cell suspension cultures, **1082**; characteristics and viral susceptibility of bovine embryonic tissue culture, **1455**; amoebae

TISSUE CULTURE—[cont'd.]
as contaminants, **1740**; colorimetric method for estimating cell numbers, **1974**; submerged culture of mammalian cells, **1975**; cultivation of embryonic chick bone in chemical media, **1978**; toxicity of certain metals and antifoam agents for tissue culture cells, **2562**; in vitro cultivation of tissues, **2698**; viability of monkey kidney culture at 5° C., **2838**; production of monolayer testis cells, **2885**; study of infection, **3601**.
See also Abortion, Equine Virus; Aujeszky's Disease; Brucella Infection, immunology; Clostridia, General; Diarrhoea, Bovine Virus; Encephalomyelitis, Equine; Encephalomyelitis, Porcine; Enteritis, Feline; Exanthema, Vesicular; Foot and Mouth Disease, virus; Fowl Paralysis and Avian Leucosis Complex; Fowl Plague; "Haemagglutinating Virus of Japan"; Hepatitis; Canine Virus; Hepatitis, Mouse Virus; Immunology, general; Laryngo-Tracheitis, Avian Infectious; Mycobacteria, General; Mycobacterium Tuberculosis Infection, immunology; Myxomatosis; Neoplasms, general; Newcastle Disease, virus; Pox Diseases, sheep pox; Rabies, general; virus; Rhinotracheitis, Bovine Infectious; Stomatitis, Vesicular; Swine Fever, virus; Toxoplasma Infection, general; Viruses, General.
TOADS. See Pregnancy, diagnosis.
TOCOPHEROL. See Vitamins.
TOLUENE. See Anthelmintics, for cattle.
TONGUE. See Heredity, cattle.
TONSILS. See Streptococcus Infection, cattle; swine.
TORULA. See Vitamins, vitamin E.
TORULOPSIS. See Mastitis, Mycotic.
TOUCANS. See Newcastle Disease, general.
TOXAPHENE. See Parasiticides, chlorinated hydrocarbons.
TOXOCARA. T. canis as potential source of visceral larva migrans in dogs, **172**; antibodies in rabbits, **173**; life history of T. canis, **1819**; **3643**; miliary nodules in dog kidneys due to T. canis, **4034**.
TOXOPLASMA INFECTION.
General. Postnatal and intra-uterine infection in rabbits, **83**; epidemiology, **1035**; survey of pork and beef samples, **1036**; reversal of therapeutic value of sulphadiazine and pyrimethamine by vitamins, **1411**; sulphones for exp. infection in mice, **1759**; in mink, **3556**; reproduction of T. gondii by internal budding, **3557**; tissue culture, **3936**; effect of pyrimethamine, **3937**.
Avian. Blood parasites of the sparrow, **405**; c.f. test with serum from exp. infected fowls, **2112**.
Cattle. Correlation between dye test and sarcosporidiosis, **2816**.
Dogs and cats. Differential diagnosis and prognosis of toxoplasmosis and nervous distemper, by paper electrophoresis, **224**; in domestic cats, **1410**; **2111**; T. gondii from a dog, **1756**; dye test for dogs, **1757**; **1758**; pathology in dogs, **3555**.
Immunology. Haemagglutination test, **742**; identification of antibodies by lysed toxoplasms, **1037**.
Sheep. As cause of abortion in ewes, **2459**; correlation between toxoplasma dye test and sarcosporidiosis in sheep and cattle, **2816**.
TRACE ELEMENTS. In nutrition of ruminants, **1855**; deficiency in cattle and sheep, **1875**.
See also Soil; and under names of minerals, e.g. Cobalt; Copper; Magnesium; Molybdenum; Zinc; etc.
TRANQUILLIZERS. See Anaesthesia and Analgesia, general; Genital System, oestrous cycle.
TRANSAMINASE. See Blood, composition.
TRANSPORT OF ANIMALS. See Disinfectants, Antiseptics and Sterilization.
TREMBLING OF PIGLETS. Myoclonia congenita (congenital tremor) in piglets, **3452**; **3453**.
TRIAMINO-"S"-TRIAZINE (TR). See Embryos, Mammalian, and Foetuses.
TRICHINELLA. Distribution in exp. infected pigs, **1110**; i/d tests with T. spiralis and Ascaris lumbricoides antigen, **1133**; microflocculation test, **1483**; immunity in mice, using excretions and secretions of adult worms, **1484**; failure to transmit mouse leucosis by trichinella, **1814**; life cycle and pathogenicity, **3628**; transmission by butchers' knives, **3629**; effect of cortisone on T. spiralis in rats, **3630**; transmission, **4020**.
See also Anthelmintics, general.
TRICHLORETHYLENE. See Poisoning, organic.
TRICHOMONAS INFECTION.
General. Physiology of trichomonads, **400**; exp. genital infection in goats and pigs with T. foetus and intestinal trichomonads from pigs, **733**; chemotherapy, **1743**; in animals and man in axenic cultures, **2099**; symposium, **2708**.
Avian. Inocualtion of chicks and poults with a strain of T. gallinarum, **72**; survival of T. gallinarum in droppings, **2100**.
Cattle. A review, **70**; diagnosis and treatment in bulls, **71**; **1030**; **3198**; **3915**; isolation of T. bovis n.sp. from calves, **730**; epidemiology in France, **731**; diagnosis, **732**; microflora associated with infection, **1029**; localization in bulls, **1742**; effect of antibiotics, **3011**.
Goats. See Trichomonas Infection, general.
Swine. Rhinitis, **1744**; incidence in digestive system and nose in the U.S.A., **1745**; gastro-enteritis, **3199**.
See also Trichomonas Infection, general.
TRICHOPHYTON. Dermatomycosis in domestic animals in Yugoslavia, **1392**; simultaneous infection in cattle with T. verrucosum and T. violaceum, **1734**; epidemiology and treatment in cattle and man, **2080**; ringworm in horses, **2444**; T. rubrum ringworm in a dog, **3532**; T. mentagrophytes dermatomycosis in man from lab. animals, **3533**.
See also Ringworm.
TRICHOSTRONGYLUS. In rabbits, **164**; T. colubriformis in calves, **808**; counting of trichostrongylids in small intestine, **809**; inheritance of resistance in sheep, **1112**; effect on utilization of Na, K, Ca, P and protein nitrogen in lambs, **1113**; effect of X-rays on infective larvae, **1114**; study in sheep by means of gastric pouch, **1123**; immune reactions to T. colubriformis infestation in sheep, **4024**.
See also Anthelmintics, for poultry; for sheep and goats.
TRICHURIS. Treatment in swine with s/c inj. of CCl_4, **797**; in ruminants and survey of the genus in Indo-Pakistan, **806**.
TRIETHYLENEPHOSPHORAMIDE (TEPA). See Embryos, Mammalian, and Foetuses.
TRIFOLIUM. See Clover.
TRINIDAD AND TOBAGO. See Reports.
TRIODONTOPHORUS. In horses in Sardinia, **807**.
TRIPHENYLTETRAZOLIUM CHLORIDE. See Erysipelothrix Rhusiopathiae Infection, general.
"TRIS" (ETHYLENEIMINO)-"S"-TRIAZINE (TEM). See Embryos, Mammalian, and Foetuses.
TRYPANOSOMA BRUCEI. Polymorphism of T. brucei and T. rhodesiense, and effect of cortisone, **728**; deposition, migration and development of blood forms, **3194**.
See also Trypanosoma Infection, general.
TRYPANOSOMA CONGOLENSE. See Trypanosoma Infection, general; cattle; treatment.
TRYPANOSOMA CRUZI. See Trypanosoma Infection, general.
TRYPANOSOMA EQUIPERDUM INFECTION (DOURINE). Duration of acquired immunity in rats, **1403**; antrycide methyl sulphate prophylaxis, **2094**; resistance to antibodies, **2456**; effect of X-irradiation on T. equiperdum in vivo and in vitro, **2800**; oxygen uptake of T. lewisi and T. equiperdum in presence of amino acids, **3912**; oxygen uptake, **3913**.
See also Trypanosoma Infection, general.
TRYPANOSOMA EVANSI INFECTION (SURRA). Tabanid flies and incidence of surra in camels in Rajasthan, **65**; blood sugar levels and effect of glucose inj. in infected rats, **3193**.
See also Trypanosoma Infection, treatment.
TRYPANOSOMA GAMBIENSE. See Trypanosoma Infection, treatment.
TRYPANOSOMA INFECTION.
General. Life cycle of T. nabiasi in rabbits in Britain, **69**; East African Trypanosomiasis Research Organization Report, **727**; staining, **729**; electrophoretic study in rabbits, **1400**; ingestion of fat from blood by T. lewisi and T. equiperdum, **1401**; cultivation, **2092**; influence of dietary cod liver oil on T. congolense, T. cruzi, T. vivax and T. brucei, **3195**; serum electrophoresis in leishmaniasis and trypanosomiasis, **3544**.
Camels. See Trypanosoma Evansi Infection (Surra).
Cattle. Demonstration of T. theileri in the stomach of an aborted foetus, **726**.
See also Trypanosoma Infection, treatment.
Horses. See Trypanosoma Equiperdum Infection; Trypanosoma Infection, treatment.
Immunology. Antibody against T. vivax in cotton rat serum, **68**; **1741**; neutralization and agglutination reactions, **1402**; duration of acquired immunity to T. equiperdum in rats, **1403**; nature of T. lewisi immunity, **3911**.
Swine. See Trypanosoma Infection, treatment.
Treatment. Nitrofurazone for T. gambiense and T. rhodesiense infection in g.pigs, **66**; action of stilbamidine in vitro, **67**; treatment of T. vivax and T. congolense infection in cattle in the Belgian Congo with antrycide and ethidium and dimidium bromide, **399**; diamines, **2091**; prothidium, **2093**; antrycide methyl sulphate prophylaxis of dourine, **2094**; furacillin, antrycide and pyraldin, **2095**; **2096**; suramin complexes, against T. congolense in small animals and T. vivax in cattle, **2801**; **2802**; studies in cattle protected by antrycide and exposed to regular challenge, **2803**; experimental, **2804**; combination of suramin and hyaluronidase in surra, **2805**; suramin complexes in T. simiae infection of pigs, **3543**; ethidium bromide against T. vivax infection in a mare, **3910**; action of berenil on strains resistant to antrycide and stilbamidine, **3914**; potential trypanocides, **4097**.
TRYPANOSOMA LEWISI. Oxygen uptake, **3912**; **3913**.
See also Trypanosoma Infection, general; immunity.

TRYPANOSOMA NABIASI. See Trypanosoma Infection, general.
TRYPANOSOMA RHODESIENSE. Polymorphism of T. brucei and T. rhodesiense, and effect of cortisone, 728; attempted isolation from wild animals, 3542.
See also Trypanosoma Infection, treatment.
TRYPANOSOMA SIMIAE. See Trypanosoma Infection, treatment.
TRYPANOSOMA THEILERI. See Trypanosoma Infection, cattle.
TRYPANOSOMA VIVAX. See Trypanosoma Infection, general; cattle; immunology; treatment.
TRYPSIN. Value of routine testing for trypsin deficiency in dog faeces, 2255; in baby pigs, 2312.
TSETSE FLIES. See Glossina.
TUBERCULOSIS. See Mycobacterium Tuberculosis Infection.
TULARAEMIA. See Brucella Tularensis Infection.
TUMOURS. See Neoplasms.
TUNISIA. See Blood, composition; Rabies, general.
TURKEY. See Foot and Mouth Disease, general; Globidium.
TURKEYS. See Amino Acids; Beta-Amino-Propionitrile; Blood, pressure; Copper; Digestive System, general; Echnioparyphium; Eimeria Infection, avian; Encephalomyelitis, Equine; Enteritis, General; Eomenacanthus; Escherichia Coli Infection; Euthanasia; Eyes, diseases; Formaldehyde; Fowl Paralysis and Avian Leucosis Complex; Growth, growth factors; Hernia; Heterakis; Histomonas Meleagridis Infection; Molybdenum; Nutrition and Metabolism, poultry; Pasteurella Infection, avian; Pleuro-Pneumonia Group; Poisoning, inorganic; organic; therapeutics; Pox Diseases, fowl pox; Psittacosis; Pullet Disease; Salmonella Infection, avian; Semen and Spermatozoa, general; diluents and additives; Sinusitis, Infectious, of Turkeys; Sodium Chloride; Syngamus; Trichomonas Infertion, in poultry; Vibrios, General; Vitamins, vitamin B (folic acid); vitamin E; Zootechny.
"TURNING SICKNESS". See Theileria Infection.
TWINS AND TWINNING. See Multiple Births.
TYMPANITES. See Bloat.
TYROGLYPHUS. Toxicity of T. farinae, 792; 2904; gamma irradiation of infested flour, 4007.

U

UDDER. See Mammary Gland.
UGANDA. See Glossina; Nairobi Sheep Disease; Reports; Salmonella Group; Taeniorhynchus.
ULTRASONIC WAVES. Action on some bacteria and viruses, 2783.
See also Embryos, mammalian, and Foetuses; Encephalomyelitis, Porcine; Pox Diseases, cow pox and vaccinia; Pregnancy, general; Semen and Spermatozoa, storage.
ULTRAVIOLET LIGHT. See Blood, composition; Immunology, vaccines; Light; Nervous System, general; Newcastle Disease, virus; Technique, microscopy (general).
UNION OF SOUTH AFRICA. See Echinococcus; Mycobacterium Tuberculosis Infection, general; Theileria Infection.
UNION OF SOVIET SOCIALIST REPUBLICS. See Anthelmintics, for sheep; Babesia Infection, cattle; treatment; Brucella Infection, general; Erysipelothrix Monocytogenes Infection; Françaiella; Genital System, general; Mange, sheep; Mycobacterium Tuberculosis Infection, general; Oestridae, Hypoderma; Rickettsia Infection, Q fever; Theileria Infection; Ticks, Argasidae.
UNITED KINGDOM. See Ataxia; Balantidium; Copper; Diarrhoea, Porcine Virus; Eimeria Infection, avian; Hygiene, food; Knackeries; Leptospira Infection, dogs; Mucosal Disease; Nematodirus; Rabies, general; Radiations; Reports; Ringworm; Salmonella Gallinarum Infection; Salmonella Infection, avian; Swine Fever; Taifan Disease; Trypanosoma Infection, general.
UNITED NATIONS ORGANIZATIONS. See Reports, international.
UNITED STATES OF AMERICA. See Bluetongue, Brucella Infection, general; Leptospira Infection, general; Microsporum Infection; Mucosal Disease; Poisoning, plants; Porphyria; Rabies, general; Reports; Ringworm; Stomatitis, Vesicular; Swine Fever, immunology; Trichomonas Infection, swine.
UREA. Excretion in mammals, 3425; excretion in newborn animals, 3754.
See also Nutrition and Metabolism, sheep; Swine Fever.
UREASE. See Brucella Group.
URETHANE. See Anaesthesia and Analgesia, in fowls; Foot and Mouth Disease, general.
URINARY SYSTEM.
General. Intravenous urography in unanaesthetized dogs, 1888; colimycin for treatment of gastro-intestinal and urinary diseases in dogs, 2787.
See also Genital System; Vitamins, vitamin B (folic acid).
Bladder. Chronic follicular cystitis in dogs, 2271.
See also Neoplasms, in cattle.
Calculi. Influence of dietary NaCl on incidence in sheep, 530; molybdenum in relation to xanthine calculi in sheep, 2243; exp. production and prevention of calcium citrate calculi in rats, 2578; effect of dietary chlortetracycline on incidence in sheep, 3663.
Kidneys. See Kidneys.
Urine. Sulkowitch test for determination of calcium, 199; study of chromogen content in cows, 938; polythionate for protein detection in urine, 1851; amino acids in horse urine, 1853; effect of A.C.T.H. on urinary neutral steroids and other metabolites in cattle, 2326; cystalline porphyrin esters from bovine porphyria urine, 2654; paper strip test for proteinuria, 2944; urinary excretion of amino acids in normal dogs and in dogs with liver cirrhosis, 2946; lactic acid content in horses after exercise, 3408.
See also Embryos, Mammalian, and Foetuses; Pregnancy, diagnosis; Semen and Spermatozoa, general; Sex Hormones, oestrogens.
UROTROPINE. See Neoplasms, in dogs.
UTERUS. See Genital System.

V

VAGINA. See Genital System.
VAGINITIS, BOVINE VIRUS. Occurrence in New Zealand, 423.
VASELINE. See Insemination, Artificial, cattle.
VEINS. See Circulatory System.
VENOMS. Antivenene against snake-bite in dogs, 568; mamagement of snake venom poisoning in domestic animals, 2296; snake-bite in animals in Israel, 3728.
VENO-OCCLUSIVE DISEASE. See Liver, diseases; Poisoning, plants.
VENTILATION. See Hygiene, livestock.
VERMIN CONTROL. Technique of poisoning rabbits, 606; 1255; rabbit control in Tasmania with sodium fluoroacetate (compound 1080), 925; toxicity of rabbit fumigants, 1256; Kimberly wallaby menace, 3763.
See also Poisoning, therapeutics and agricultural chemicals.
VERTEBRAE. See Column, Vertebral.
VESICULAR DISEASES, GENERAL. Serological differentiation, 87; differentiation between vesicular stomatitis and vesicular exanthema, 430.
See also Exanthema, Vesicular; Foot and Mouth Disease; Stomatitis, Vesicular.
VIBRIO COLI. See Vibrios, General.
VIBRIO FETUS INFECTION.
General. Rapid cultivation, 53; human infection with V. fetus and a related vibrio, 1383; infectivity for chick embryos of colonial variants of V. fetus, 1720; colonial forms, 1721; 3161; agglutinating antigens of variants, 1722; morphological and serological characteristics, 2065; some metabolic activities of V. fetus, 2437; motility and stage of infection, 2778; pathogenicity, 3162.
Cattle. Occurrence in genital organs of cows and bulls, 50; experimental, 51; present views, 383; diagnosis, 711; incidence, diagnosis and treatment in bulls, 712; 2064; 2435; 2779; control, 1719; 2436; effect of catalase-positive and catalase-negative vibrio on fertility, 2066; effect of antibiotics, 3011; in Western Australia, 3522; isolation from semen, 3523.
See also Vibrios, General.
Sheep. Transmission and immunity, 52; exp. oral transmission, 1018; genital vibriosis, 1381; chlortetracycline for prevention of abortion, 1382.
VIBRIO METCHNIKOVI. See Vibrios, General.
VIBRIOS, GENERAL. Morphology and formation of granules in V. coli, 1019; serology of 20 strains from bovine abortions as compared with V. fetus, 1380; V. metchnikovi infection in turkeys and pheasants, 1384; similarities of V. coli and V. fetus, 2780; incidence and identification in cows, 3524.
See also Vibrio Fetus Infection, general.
VIBRIO SUIS INFECTION. In pigs, 713; vibrionic dysentery in pigs in Poland, 2438; aetiology of swine dysentery, 2439; diagnosis and pathology of porcine dysentery, 2781.
VICIA ERVILIA. See Poisoning, plants.
VICUNAS. See Alpacas, Llamas and Vicuñas.
VIETNAM. See Encephalitis, Japanese B; Rinderpest; Sarcosporidiosis.
VIRUS ABORTION OF EWES. See Abortion, Ovine Virus.
VIRUS ABORTION OF MARES. See Abortion, Equine Virus.
VIRUS B. Effect on tissue culture cells, 2466; natural infection in monkeys, 3977; similar neurotropic virus infection in monkeys, 3978.

"VIRUS DIARRHOEA-INDIANA". See Diarrhoea, Bovine Virus.

VIRUSES, GENERAL. Adsorptive processes in viruses, 776-777; latent infection in rabbits with adenovirus type 5, 1073; the concept of virus, 1458; virus diseases of farm animals, 1793; infectivity of ribonucleic acid from virus-infected tissues, 2133; effect of Aujeszky virus and B virus on tissue culture cells, 2466; interference between viruses and chick embryo fibroblast monolayers, 2499; effect of anticellular sera on virus multiplication in tissue culture, 2509; a feline virus associated with intranuclear inclusion bodies, 2865; growth of myxoviruses in bovine mammary gland, 3244; neurotropic virus infections in Slovakia, 3580; cultivation of dengue, Western equine encephalomyelitis, Japanese B and West Nile virus in tissue culture, 3582; enteroviruses, 3599; chemotherapy, 3600; viruses and rickettsia of mammals, 3602.
See also Disinfectants, Antiseptics and Sterilization; Embryos, Fowl; "Haemagglutinating Virus of Japan"; Immunology, general; antibodies and antigens; precipitation; vaccines; Interferon; Porphyrins; Reports, East Africa; Sodium and Sodium Compounds; Technique, viruses and rickettsia; Tissue Culture; Ultrasonic Waves; Wesselsbron Virus.

"VISNA". A demyelination transmissible disease of sheep in Iceland, 426.

VITAMINS.

General. Vitamin-sparing action of sorbitol, 860; reversal by vitamins of therapeutic value of sulphadiazine and pyrimethamine against toxoplasmosis, 1411; effect of deficiency on behaviour of rats, 2603; effect of endocrine imbalances on requirements, 2967; effect of temperature on blood levels in cattle, 3345; effect of tocopherol on utilization of carotene given i/v, 3683.
See also Salmonella Gallinarum Infection.

Vitamin A. Potentiating effect of certain plant and animal materials on hypervitaminosis in rats, 208; effect of deficiency on skull, optic nerves and brain development in cattle, 532; rachitogenic effect, 533; 855; supplements for sheep and cattle, 1176; piglet mortality associated with maternal deficiency, 1870; effect of vitamin E on utilization of vitamin A and reproduction in fowls, 1871; effect on c.s.-fluid pressure in rabbits with hydrocephalus due to maternal deficiency, 2251; a fertility factor in cockerels, 2253; absorption, 2593; utilization of vitamin A and carotene by normal and deficient sheep, 2959; effect of dietary antibiotics on plasma content, 2960; deficiency in rats and fowls, 2961; 2962; deficiency with and without dietary cholesterol, 2963; nucleic acid metabolism in deficient rats, 2964; liver storage in rats and pigs, 3341; 3342; effect of paraffins on carotene utilization in ruminants, 3682; effect of beta-carotene on egg production in ducks, 3684; nucleic acid metabolism in rats during increased vitamin A content of blood, 3685; absorption studies, 3686; deficiency in poultry, 3687.
See also Cod-Liver Oil; Milk and Milk Products, composition; Vitamins, general.

Vitamin B (complex). Content in milk in bovine mastitis, 650; perfusion method for study of absorption in sheep, 2601; 2602.
See also Influenza, swine.

Vitamin B (folic acid). Effect of folic acid on glycine utilization in poults, 540; effect of deficiency and oestrogens on chick oviduct, 859; abnormalities of urinary system in rat embryos from deficiency during pregnancy, 1537; perosis and folic acid antagonism in fowls, 1874; maternal and foetal folic acid and B_{12} at parturition, 2965.

Vitamin B (nicotinic acid). Role of chlortetracycline and intestinal flora in niacin and manganese requirement of chicks, 844.

Vitamin B_1 (thiamine). Properties of pyrithiamine, anti-B vitamin, 211; effect of streptomycin on synthesis in sheep's rumen, 538; in contents of alimentary tract in sheep, 539; deficiency in horses, 1178; effect of penicillin on thiamine synthesis in rats, 4052.

Vitamin B_2 (riboflavin). Deficiency, 1536; requirement, 3690.

Vitamin B_{12}. Vitamin B_{12} and antibiotics in animal nutrition, 518; 3344; activity in organs and excreta of sheep, 861; 1179; deficiency in cattle and sheep, 1875; histopathology of hydrocephalus resulting from deficiency, 2252; maternal and foetal folic acid and B_{12} at parturition, 2965; effect of antibiotics on cyanocobalamin-deficient rats, 1515; biochemistry, 2966.
See also Growth, growth factors; Leptospira Infection, general.

Vitamin C (ascorbic acid). Beneficial effect of lucerne on toxicity of glucoascorbic acid in rats, 541; hypertrophic osteodystrophy associated with disturbed synthesis in dogs, 862; amino acids in plasma of scorbutic g.pigs, 2604.
See also Iron; Salmonella Gallinarum Infection.

Vitamin D (calciferol). Effect on mineralization of bone, 1533; hypervitaminosis D in monkeys, 2594; overdosage, 2595.
See also Calcium; Sterility, cattle.

Vitamin D_2. Effect on calcium and inorganic phosphorus content of horse serum, 582.

Vitamin D_3. Effect on winter egg production in Sydney, 534; toxicity for calves, 1872; effect of i/v inj. on occurrence of milk fever, 2257.

Vitamin E (tocopherol). Morphology of deficiency, 209; breeding and racing of Thoroughbreds given large doses of alpha tocopherol, 247; paper electrophoresis of muscle fractions from deficient rabbits, 535; deficiency in poults and exudative diathesis, 858; effect of gonadotrophins, oestrogens and vitamin E on anoestrus in sows, 944; nutritional factors and deficiency symptoms in chicks, 1177; effect of vitamin E on utilization of vitamin A and reproduction in fowls, 1871; deficiency in monkeys, 1873; for cyclic sterility in cows, 1961; supplements for pigs, 2254; effect of methylene blue on mouse paralysis and heart failure (vitamin E deficiency), 2597; metabolic changes in deficiency, 2598; exudative diathesis in chicks, 2599; acceleration of deficiency by Torula yeast, 2600; effect of deficiency on proteins in rabbit muscle extracts, 3689; prophylaxis of congenital abnormalities, 3793.
See also Babesia Infection, general; Encephalomalacia, Avian; Iron; Vitamins, general.

Vitamin K. In brucellosis of goats and sheep, 702; in avian coccidiosis, 1404; 1750; inhibition in chicks by sulphaquinoxaline, 1405; requirement of rumen strains of Fusiformis nigrescens, 2782.

VOGELOIDES. V. ramanujacharii, a lungworm from cats, 2209.

VOLES. See Mycobacterium Tuberculosis.

VOMERO-NASAL (JACOBSON) ORGAN. See Respiratory System, general.

VOMITING. See Digestive System, general.

VULTURES. See Newcastle Disease, general.

VULVA. See Genital System.

W

WARBLES. See Oestridae, Hypoderma.

WARFARIN. See Blood, coagulation; Poisoning, therapeutics and agricultural chemicals.

WATER. Metabolism in fowls, 253; function in the body, 1505; suitability of artesian water for pigs, 1506; relationship of water and salt, 1508; water equilibrium in health and disease, 1509-1511; metabolism in sheep, 2314; changes in body weight in horses during rehydration, 2558; measurement of liquid intake in small animals, 2559.
See also Acclimatization and Climate; Digestive System, ruminant digestion; Growth, general; Nutrition and Metabolism, carnivores; cattle; Zinc.

WEATHER. See Altitude; Temperature; Water.

WEIGHT, BODY. Dressed carcass weight of N'Dama and zebu cattle, 954; relationship between live and carcass weight in pigs, 1275; changes in horses during rehydration, 2558; of Santa Gertrudis-Hereford crosses, 3454.
See also Anthelmintics, for cattle; for poultry; Ascaridia; Cattle, helminth parasites; Flies; Growth, general; Nutrition, in cattle; Temperature, environmental; Ticks, general.

WESSELSBRON VIRUS. Transmission by Aedes caballus, 3231; infection in man, 3232.

WEST NILE VIRUS. See Viruses, General.

WHEAT. See Nutrition, in relation to disease.

WHEY. See Brucella Infection, diagnosis.

"WHISTLING". See Nervous System, diseases.

WHITE MUSCLE DISEASE. In calves and lambs, 2948; serum transaminase, 2949.
See aslo Muscles.

WHITESIDE TEST. See Mastitis, Bovine, diagnosis.

"WHITE-SPOTTED KIDNEY". See Kidneys.

WILD ANIMALS AND BIRDS. Diseases of game, birds and fish in Switzerland, 2262.
See also Anthelmintics, general; Arthropod Parasites, General; Babesia Infection, general; Books, parasitology; Brucella Infection, general; Cytoleichus; Echinococcus; Encephalitis, General; Encephalomyelitis, Equine; Hepatitis, Canine Virus; Hepatozoon; Leptospira Infection, general; Leucosis, general; Mycobacterium Tuberculosis Infection, general; Psittacosis; Rabbits; Rabies, general; Rickettsia Infection, general; Q fever; Ringworm; Salmonella Infection, avian; Sarcosporidiosis; Spirochaeta Infection; Toxoplasma Infection, general; Trypanosoma Infection, general; Trypanosoma Rhodesiense; Vermin Control.

WING GANGRENE. See Staphylococcus Infection, fowls.

WINTER DYSENTERY. See Diarrhoea, Bovine Virus.

"WOFATOX". See Parasiticides, phosphorus compounds.

WOOD PRESERVATIVES. See Poisoning, therapeutics and agricultural chemicals.

WOOL. Effect of subclinical worm infestation on production in sheep, **165**; growth stimulation by thyroxine, **1183**; production per unit of skin area, **1233**; relation between crimp and fineness, **1234**; skin morphology and wool production, **1967**; fungal and bacterial flora associated with fleece rot, **2083**; photoperiodicity and wool growth in rams and wethers, **2310**; resistance of certain Merino strains to fleece rot, **2446**; colour, **2692**; effect of feeding on fibre diameter, **3404**; development of curls in Karakul foetuses, **4153**.
See also Copper; Parasiticides, chlorinated hydrocarbons.
WORLD HEALTH ORGANIZATION (WHO). See Hygiene, food; Man, Diseases of Animals Transmissible to and from; Rabies, general; Reports, international.
WOUNDS. See Clostridia, General; Embryos, Fowl; Rabies.
WUCHERERIA. W. malayi microfilariae in cats in India, **494**; exp. transmission of W. malayi, **2210**.

X

XANTHINE. See Urinary System, calculi.
X-RAYS. Effect of total body X-irradiation on mouse susceptibility to E. coli endotoxin, **23**; effect of total body X-irradiation on circulation in splenectomized dogs, **559**; effect of high energy radiations on E. coli and Staph. aureus, **3164**; reproductive fitness in bitches exposed to total-body X-irradiation, **4078**; haemorrhagic lesions following whole-body exposure, **4081**.
See also Ascaris; Immunology, antibodies and antigens; Neoplasms, general; Sterility, general; Radiations; Radiography; Trichostrongylus; Trypanosoma Equiperdum Infection.
XYLAN. See Digestive System, ruminant digestion.

Y

YEASTS. As symbionts in animals, **1391**; necrogenic potency, **2237**; differentiation by fluorescent antibody, **3529**.
See also Cryptococcus; Growth, growth factors; Semen and Spermatozoa, diluents and additives; Torulopsis; Vitamins, vitamin E.
"YELLOW FAT DISEASE". Histochemistry of adipose tissue in affected pigs, **3669**.
YTTRIUM. See Disinfectants, Antiseptics and Sterilization; Radiations.
YUGOSLAVIA. See Anaplasma Infection, cattle; Babesia Infection, general; Dogs, helminth parasites; Erysipelothrix Rhusiopathiae Infection, sheep; Leptospira Infection, general; Lungworms; Rabies, general; Rickettsia Infection, heartwater; Streptococcus Equi Infection; Swine Fever, immunology; Theileria Infection, cattle; Ticks, general; Argasidae; Trichophyton.

Z

ZAMENIS. See Tapeworms.
ZDAR DISEASE. Leptospiral aetiology, **1192**; Senecio poisoning, **1193**.
ZEBRA. See Klossiella.
ZEBU CATTLE. See Animal Production; Behaviour of Animals; Stephanofilaria; Sweating and Sweat Glands; Weight, Body.
ZINC. Effect of excess on water consumption in fowls, **207**; removal from solutions by Ca and P supplements, **1529**; deficiency in chicks, **2580**; metabolism, **3325**; role in rat fertility, **3326**; **3327**; effect of Zn and K on bone formation, growth and feathering in poults, **2588**; requirements in chicks, **3680**.
See also Parakeratosis; Poisoning, inorganic; Snails and Slugs.
ZOOLOGICAL GARDENS. See Foot and Mouth Disease, general; Klossiella; Newcastle Disease, general.
ZOONOSES. See Man, Diseases Of Animals Transmissible To and From.
ZOOTECHNY. Sheep husbandry in tropical Australia, **953**; effect of inbreeding on age trends in Merino, **3455**; fluorescent light for turkey breeders, **4142**; constitutional and environmental interactions in rearing different breeds of dogs, **4154**.
See also Acclimatization and Climate; Books, diseases, general; reproduction; zootechny; Fertility; Insemination, Artificial; Laboratory Animals; Sterility; Weight, Body; Wool.
ZYMOSAN. See Bacteriophage.

ERRATA

p. 9, abst. 44. In title translation, for "antibodies," read: antibiotics.

p. 42, abst. 245. End of para. I. For "ilem", read: ileum.

p. 60, abst. 339. Title line 3. For "nicardia", read: nocardia.

p. 86, abst. 498, line 1. For "veneral", read: venereal.

p. 112, abst. 657. In title translation, for "Inravenous", read: Intravenous.

p. 150, abst. 887. In title translation and lines 3, 9 and 11 of abst., for "zinc phosphate", read: zinc phosphide.

p. 183, abst. 1066, line 5 of abst. The words "and coughing" should be deleted.

p. 223, abst. 1296. In lines 10 and 11, the figures given for horses are incorrect and should read: 1,098,000 horses (compared with 1,542,000 in 1938).

p. 246, abst. 1440. In line 8 of abst., for "Muktsewar", read: Mukteswar.

p. 264, abst. 1554. In line 1 of abst., for "cystisine", read: cytisine.

p. 265, abst. 1562. The last sentence should read as follows: Sheep were killed with 0·04–0·05 g./kg. of sodium edetate.

p. 290, abst. 1707. Line 2 of abst. (II). For "Strain 53 H 35", read: Strain 53 H. 38.

p. 297, abst. 1751. Title translation line 2. For "Macdonia", read: Macedonia.

p. 315, abst. 1852. Abstractor's name should read: A. G. CULEY. abst. 1856. Title line 3. For "deficiences", read: deficiencies.

p. 327, abst. 1930. Line 1 of title. For "WILWORTH, A. M.", read: WILWERTH, A. M.

p. 333, abst. 1962, para. 2. The third sentence should be amended to read: From these small-scale tests it appeared that fertility could not be raised significantly by enucleation of the corpus luteum on the 11th or 12th day after oestrus.

p. 386, abst. 2206. Title line 2. For "diagnosiis", read: diagnosis.

p. 388, abst. 2219. Line 10 of abst. For "form", read: from.

p. 412, abst. 2368. This should be included under the heading TECHNIQUE AND APPARATUS.

p. 424, abst. 2407. In title translation, for "Bacterial", read: Bactericidal.

p. 476, abst. 2703. Line 3 of title. For "MACOWEN, K. D. S.", read: MACOWAN, K. D. S.

p. 568, abst. 3225. In line 3 of title translation, for "Alrara", read: Altara.

p. 569, abst. 3229. Line 6 of abst. For "form", read: from.

p. 571, abst. 3242. In line 6 of title, the volume number "5" should read: 10.

p. 573, abst. 3248. Line 1 of abst. For "California 1194 strain", read: California 11914 strain.

p. 586, abst. 3321. Lines 1 and 2 should read: FERREIRA NETTO, J. M., MOREIRA, H. A. & CARNEIRO VIANA, J. A. (1957). Line 5 of title for "5", read: 10.

p. 589, abst. 3331. Last two lines. For "ultilization", read: utilization.

p. 612, abst. 3436. In line 5 of title, for "5", read: 10.

p. 625, abst. 3480. Line 2 of title. For "pig tuberculosis", read: guinea pig tuberculosis.

p. 645, abst. 3597. In line 4 of title, the volume number should read: 10.

p. 663, abst. 3698. In penultimate line, for "larygeal", read: laryngeal.

p. 736, abst. 4094. Para. 2, line 2. For "seasonably", read: seasonally.

p. 744, abst. 4137. Line 1 of title. For "ZACHARIAE, E.", read: ZACHARIAE, F.

abst. 4142. Lines 1 and 5. For "flourescent", read: fluorescent.

Printed in Great Britain by CHARLES BURRELL & SON, Chertsey, Surrey.